DOE/EH--0088

DE89 012243

U.S. Department of Energy

Environment, Safety, and Health

Washington, DC 20545

Technical Safety Appraisal of the Hanford Tank Farm Facility

May 1989

TECHNICAL SAFETY APPRAISAL

OF THE

HANFORD TANK FARM FACILITY

Prepared By

Lorin C Brinkerhoff
Team Leader

Reviewed By

James P. Knight
Senior EH Manager

Approved By

Richard W. Starostecki
Deputy Assistant Secretary
Safety, Health and Quality Assurance

4/28/89

TABLE OF CONTENTS

I.	INTRODUCTION	I-1
II.	PERFORMANCE EVALUATION	II-1
III.	REVIEW FINDINGS	III-1
	A. Organization and Administration	OA-1
	B. Operations	OP-1
	C. Maintenance	MA-1
	D. Training and Certification	TC-1
	E. Auxiliary Systems	AX-1
	F. Emergency Readiness	ER-1
	G. Technical Support	TS-1
	H. Security/Safety Interface	SS-1
	I. Experimental Activities	EA-1
	J. Facility Safety Review	FR-1
	K. Nuclear Criticality Safety	CS-1
	L. Radiological Protection	RP-1
	M. Personnel Protection	PP-1
	N. Fire Protection	FP-1
IV.	NOTEWORTHY PRACTICES	IV-1
APPENDIX A:	System for Rating Concerns	A-1
APPENDIX B:	Classification and Tabulation of Concerns	B-1
	ATTACHMENT B-1: Classification of Concerns	B-1-1
	ATTACHMENT B-2: Tabulation of Concerns	B-2-1
APPENDIX C:	Team Composition and Areas of Responsibility	C-1
APPENDIX D:	Biographical Sketches of TSA Team Members	D-1

ACRONYMS

The following acronyms are used throughout this report without definition.

ALARA	as low as reasonably achievable
DOE	Department of Energy
DOE-RL	DOE Richland Operations Office
OSHA	Occupational Safety and Health Administration
OSR	Operational Safety Requirement
PNL	Battelle Pacific Northwest Laboratories
SAR	Safety Analysis Report
Tank Farm	Hanford Tank Farm Facility (200 East Area and 200 West Area)
TSA	Technical Safety Appraisal
WHC	Westinghouse Hanford Corporation

I. INTRODUCTION

This report presents the results of one in a series of TSAs being conducted of DOE nuclear operations by the Assistant Secretary for Environment, Safety, and Health Office of Safety Appraisals. TSAs are one of the initiatives announced by the Secretary of Energy on September 18, 1985, to enhance the DOE environment, safety and health program.

This report provides the results of a TSA of the Tank Farm in the 200 East and 200 West Areas located on the Hanford site. Figure 1 provides the location of all facilities on these two site areas. The appraisal was conducted by a team of experts assembled by the DOE Office of Safety Appraisals and was conducted during onsite visits of March 20-24 and April 3-14, 1989. At the Tank Farm, the processing of spent reactor fuels to recover the useful radioactive products is accompanied by the production of radioactive waste. Because many of these wastes will retain radioactivity for many years, they must be safely handled, contained, and disposed with regard to protection of the environment, employees, and the public. Dilute low-level waste and five year "cooled" aging wastes are pumped to an evaporator for concentration. The radioactive liquid and solid wastes are stored in underground carbon steel tanks ranging in capacity from 55,000 to over one million gallons.

One hundred and forty-nine single shell tanks (SSTs) were constructed between 1944 and 1964. All SSTs have been removed from active service. Twenty-eight double-shell tanks (DSTs), all having been built since 1968, are in active service. The DSTs are concrete-reinforced vessels with two double carbon steel liners - a tank within a tank. The annular space between the steel liners is monitored to detect any leakage from the inner tank and to trap any leakage so that it can be removed from the tank.

A Grout Treatment Facility has been installed which will take liquid waste from assigned DSTs and combine it with dry grout forming material. The resultant slurry will be pumped to a Grout Disposal Vault where it will solidify and be stored.

Other supporting facilities currently include provisions for transporting waste via railcar, and a system of double encased pipes and pumps for transfer of liquids and suspended solid waste material.

The principal hazards presented by operations in this facility include radiation fields, ingestion and inhalation of radioactive materials, and industrial and occupational hazards associated with hazardous and mixed waste storage, treatment and disposal.

Since a TSA is designed to be an appraisal of an operating facility, it is accepted as a given that the facility and its equipment have been appropriately designed, constructed, and tested, and that the current SARs adequately evaluate the risks presented by the operations. This appraisal does address, however, whether the facility design and its current operations are consistent with the SARs, and particularly whether the current operations are being conducted within the bounds of the OSRs established for the operation of the facilities.

TANK FARM LOCATIONS

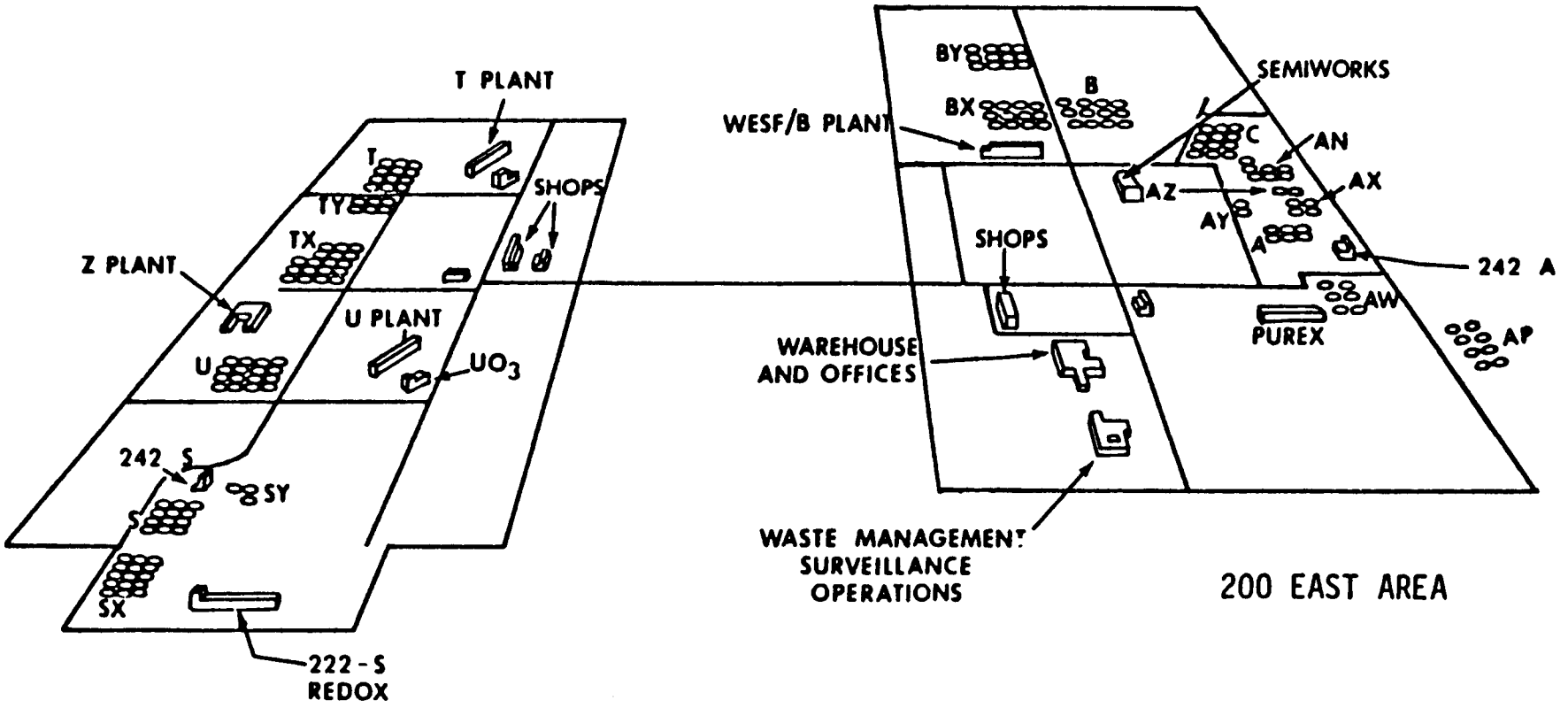

FIGURE 1

The Appraisal Team's efforts were guided by a set of pre-established Performance Objectives with supporting criteria. This report contains the more significant findings obtained, relative to each Performance Objective. The concerns identified by the Appraisal Team are located under the Performance Objective which are the most relevant to the concern. In many cases, findings supporting the concern can also be found under other Performance Objectives. When this is the case, cross-references have been provided.

A concern addresses a situation that in the judgment of the Appraisal Team members: (1) reflected less than full compliance with a DOE safety and health requirement or mandatory safety standard; (2) threatened to compromise safe operation; or (3) if properly addressed, would substantially enhance the excellence of that particular situation, even though that part of the operation was judged to have a currently acceptable margin of safety. Because of this last category, addressing the excellence of the operation, more concerns are reported than would result from a strictly compliance-oriented appraisal.

In addition to identifying concerns, the Appraisal Team looked for exceptional practices in accomplishing Performance Objectives. Identified "Noteworthy Practices" are addressed in Section IV under the subject areas to which they pertain. Other DOE facilities are encouraged to adopt these Noteworthy Practices when they are applicable to their operations.

This appraisal is an evaluation at a fixed point in time. As a result, improvements to safety that were planned, but are not yet completed, are identified as concerns if the Appraisal Team judged that failure to complete the improvements would significantly impact the safety of facility operations.

To ensure accuracy and appropriateness of the report's contents, the Appraisal Team divided into four review groups to provide detailed critiques to other review group members; each team member validated his findings and concerns with contractor management counterparts; and, as a last step, the entire Appraisal Team, as a group, spent considerable time addressing the report's clarity and consistency.

The findings and concerns developed by the Appraisal Team were shared with WHC and DOE-RL in an exit meeting held on April 13, 1989. An executive closeout meeting was held with DOE-RL management on April 14, 1989. The final report has been validated for factual accuracy with WHC and DOE-RL.

Results of this appraisal are given in Section III for each of 12 technical safety areas at the Tank Farm. The Performance Objectives for Experimental Activities and Nuclear Criticality Safety were not considered applicable to the operations at the Tank Farm. This report includes a summary of the findings and concerns for each technical safety area as well as the findings and concerns in each Performance Objective of the technical safety areas. Appendix A contains a description of the systems for classifying concerns. The concerns are classified and tabulated in Appendix B.

The Appraisal Team was guided by Mr. James P. Knight, Director, DOE Office of Safety Appraisals. Mr. Lorin C. Brinkerhoff of the DOE Office of Safety Appraisals was the Team Leader. The Appraisal Team consisted of 15 experts including DOE employees, DOE contractors and outside consultants. The members of the Appraisal Team and their areas of principal assignment are listed in Appendix C. A biographical sketch of each of the Appraisal Team members is included in Appendix D.

The Appraisal Team wishes to express its appreciation for the excellent cooperation exhibited by all levels of WHC management and staff, and for the hospitality and support of DOE-RL.

II. PERFORMANCE EVALUATION

Although this is the first TSA of the Tank Farm, there were prior TSAs conducted at other Hanford facilities: PUREX (March 1988) and the Plutonium Finishing Plant (October 1987). There is evidence that lessons-learned from prior appraisals at Hanford have been reflected in the operations of the Tank Farm. Of significance is the noticeable number of Performance Objectives with relatively few concerns identified by the Appraisal Team. Based on prior self-assessments, problems have been previously identified by DOE-RL and the contractor. An integrated long-term approach has been developed and knowledgeable staff and managers have been assigned to implement viable solutions. Interviews with the affected people indicate that there is a true recognition of the problems and the focus is on resolving the underlying issues. Based on the Appraisal Team insights and interviews, the Tank Farm activities reflect a contractor response to revised DOE directions that have been reenforced by DOE field management at the highest levels. Knowledgeable DOE managers are involved in the activities to emphasize quality in all aspects of operations. This is not to say there are not any problems, there are. However, contractor self-appraisals and oversight appraisals by DOE-RL previously identified the issues. Consequently, this TSA identified that many issues do exist and they are being addressed in a manner that should deter recurrence.

The contractor is completing the first phase of a major revitalization of the Waste Management Program at the Hanford Reservation. This effort is one part of a site-wide performance improvement effort undertaken by the DOE-RL starting with the consolidation of operations under a single contractor in 1987. In carrying out its oversight and direction responsibilities, DOE-RL has moved to foster DOE presence at the work site and to provide timely feedback and guidance to the contractor. Through frequent and increasingly technically competent audits, as well as use of the award fee process, DOE-RL has sent a clear message of its expectations for the Tank Farm and the contractor is responding. It is encouraging to see such initiatives. However, good performance needs to be demonstrated on a sustained basis at all Hanford facilities.

At this time, some 18-months into the effort, restructuring of upper management and the issuance of top level manuals setting forth goals and standards appropriate to the conduct of radioactive waste storage operations are nearing completion. The management team now in place has produced meaningful initial results in its ongoing efforts to establish a new work culture. Line responsibility and accountability for safety are clearly established and demanded in the performance of subordinate managers. Safety and quality have been fostered by management action such as requiring work be stopped where inadequate or weak procedures are found. After revisions or temporary replacement procedures are developed, production is allowed to resume. A recently instituted program verifies a selected number of procedures each month against actual operations and equipment using a managerial walk-down. All procedures are to be reviewed once every 30 months.

Although the procedure upgrade program can be further improved, the emphasis on quality work and safety is noticeable in the work place as evidenced by the acceptance of the workers.

A number of concerns in this TSA reflect that staffing is not yet adequate to meet management safety objectives. For example, non-certified Shift Manager and Shift Support Supervisors were observed, and inexperienced cognizant engineers in Plant Engineering are not being trained or certified quickly enough to meet work loads. Recruiting and maintaining qualified staff at all levels for the contractor, as well as DOE-RL staff, remains a challenge.

Programs are underway to refurbish the SARs for the Tank Farm, as well as all other aspects of the Waste Handling Complex at the Hanford Site. Past practice has resulted in piecemeal analyses that do not form an adequate basis for the setting of operational limits -- OSRs. These efforts are fundamental to establishing the envelope of safe operation. Well qualified and experienced personnel are needed to complete this effort. The present extended schedule that projects completion in 1996 appears excessive.

Operational safety at the Tank Farm is adequate for day-to-day operations in the short term while management develops and puts into place long-term fixes. Reliance on interim compensatory measures is appropriate and underlying issues are being addressed. Infusing new safety philosophies and a new safety ethic through the entire work force is a formidable task that is just beginning. The programs and approach examined during the appraisal of the Tank Farm appear to be sound, properly oriented, and reflect a continued commitment to long-term improvement.

III. REVIEW FINDINGS

All of the Performance Objectives which were applicable to the Tank Farm are discussed in this section. The findings which follow the statement of each Performance Objective address the more pertinent facts obtained and conclusions drawn from: (1) observing routine operations, emergency exercises, and the physical condition of the facilities; (2) talking with WHC management, technical, and craft personnel; and (3) reviewing policy statements, records, procedures, and other documents.

Sixty-eight concerns are identified in this report. Addressing these concerns with appropriate corrective actions will improve the level of safety of the operations in this facility. Each concern has been classified as to its seriousness in accordance with the system described in Appendix A. The results are summarized in Appendix B. The findings that serve as the basis for a concern can be found immediately preceding the concern and are identified by the use of an asterisk (*). To understand the full intent of any concern, it is necessary to read its basis. The resolution of the individual concerns may not be sufficient to prevent their recurrence. Therefore, the underlying issues or root causes also need to be sought out and addressed.

Of the 68 concerns, all are Category III with the exception of three which are judged to be Category II. Category II concerns are defined as having a hazard significance and urgency such that the necessary response should be addressed shortly following the close-out of the appraisal. Category III concerns are expected to be addressed in a normal, responsive manner.

The criteria for a Category II concern states that "...consideration should be given to whether facility shutdown is warranted under the circumstances." The Appraisal Team considered this issue and judged that facility shutdown was <u>not</u> warranted based upon any individual concern or the collective impact of all the concerns.

The program activities evaluated were, generally, found to be conducted in accordance with acceptable operating procedures. However, instances were found where compliance with some aspect of a DOE-mandated requirement is deficient or could be improved, or where a greater level of safety is needed to be attained through strict adherence to existing procedures. Other instances were identified where procedural improvements were required.

The Appraisal Team realizes that most of its negative findings are only symptomatic of underlying causal factors. The Appraisal Team has made an effort, drawing upon the extensive relevant experience of its members, to identify the underlying causal factors in developing its statements of concern. However, the Appraisal Team recognizes that this effort is imperfect at best because of the limited time it could devote to analyzing the problem and its relative unfamiliarity with the details of the contractor's overall operation. Therefore, the Appraisal Team believes that the contractor should consider the findings, and even the statements of concern, as possibly symptomatic of some set of deeper root causes, and should search out and correct root causes so that there will be reasonable assurance that improvements in the safety of the operation will be sustainable.

A listing of the total set of concerns developed by the Appraisal Team can be found in Appendix B.

A. ORGANIZATION AND ADMINISTRATION

The organization and administration of the Tank Farm reflects the ongoing WHC efforts to establish a new work culture in which safety and quality are seen as coequal with the other components of the WHC mission. The hierarchical system of WHC controlled manuals reflects the management philosophy of top-down direction and bottom-up accomplishment and accountability. The upper level manuals are written to high standards of clarity, brevity and substance. However, lower-level procedures have not yet been revised to meet these standards.

Continuing adjustments of the lower-level organization reflect the movement toward a line organization from the matrix organization used by previous contractors. Manager responsibilities are clearly defined and there is evidence of strong management commitment to program objectives. Some professional and working-level personnel have not fully accepted the new management philosophy and working culture.

Staff shortages are evident in several areas. The recent change in direction of the personnel programs from an active out-placement program to an aggressive recruitment program will require time to overcome the impressions of instability and low-economic potential that have been developed in the personnel marketplaces. Recruitment difficulties will necessarily slow the universal acceptance of the new work culture and standards.

Although the WHC management approach to organization and administration is excellent, it has not been implemented fully at all levels in all areas. In some areas (e.g., radiation protection and waste transportation and packaging) practices and procedures do not meet DOE and WHC standards.

The Quality Assurance Program at the Tank Farm is based upon the site-wide Quality Assurance Manual and the plant specific "Quality Assurance Plan". Measurable performance goals and objectives for safety and quality have been established and promulgated in the annual "Quality Improvement Plan". Tracking and trending systems are in place to provide management with timely reports regarding the status of action items and progress against established goals. There is a noticeable improvement from previous TSAs in employee attitudes and cooperative spirit, which may be attributable to the adoption of the "Total Quality" concept and the implementation of the Quality Improvement Programs.

Management assessment of quality and safety of plant operations has been hampered by infrequent independent quality assurance audits by Audit Program Administration and by the narrow scopes of inspections and surveillances by line organizations and quality groups. Some aspects of the records management system are not yet in compliance with the requirements of the WHC Records Management Manual and DOE Orders.

OA.1 FACILITY ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Management should organize and administer the operation to provide for effective implementation of facility activities relating to safety and health.

FINDINGS:

- This Performance Objective was met in part. Deficiencies existed in staff resources, and in documentation of working-level procedures and responsibilities.

- The organizational structure was clearly, but not yet completely, defined in a hierarchical set of organizational charts and charters contained in the WHC controlled manual, Organization Charts and Charters, WHC-CM-1-2. Tank Farm charts and charters were scheduled for completion and for inclusion in Tank Farm Surveillance and Operations Administration, WHC-CM-5-7, during April, 1989. A major decision was made during the Appraisal Team visit when the Grout Treatment Facility was removed from the Tank Farm Organization and made an independent, parallel organization to allow more focused management attention. A new management structure was approved February 27, 1989 for the Quality Assurance (QA) Organization and is described in Chart 3.6 (to supersede Chart 3.1) in WHC-CM-1-2.

- The responsibilities and authorities of each manager were clearly defined in the organizational charts and charters. The responsibilities and authorities of other professional positions were defined in the WHC manuals for requirements and procedures and in performance appraisal objectives for each individual, which are required to be reviewed and redefined at least annually.

- Quality assurance overview is independent of programmatic responsibility. The Safety, Quality Assurance and Security Organization provides separate and independent evaluations of the safety and quality activities at the Tank Farm.

- Management places heavy emphasis on administrative controls and operating procedures, coupled with employee training and motivation, to ensure safe and reliable operation. The Tank Farm Manager stated his intent to use the Event Fact Sheet review process to identify areas where improvement of procedures and administrative controls would be beneficial. In addition, a plan for a comprehensive compliance review of all Tank Farm administrative procedures was scheduled for completion in June 1989. The review is intended to ensure consistency with all other WHC requirements and procedures. The "B Plant Compliance Plan,"

which will serve as a model for the Tank Farm review plan, was detailed and comprehensive.

- Management personnel demonstrated a clear understanding of their managerial authority, responsibilities and interfaces, including their quality and safety responsibilities. The Quality Assurance Staff have the organizational visibility and authority to handle quality issues and to help solve quality problems.

- Staffing was below budgeted levels and, in some areas, below the level considered necessary to achieve management objectives. (See Concern OA.5-1)

- Staffing and resources have been adequately determined for the Waste Management and Site Support Quality Assurance Groups but recent reorganizations and retirements resulted in an actual staff of 55 (including four temporary and three contractor personnel), against a planned staff of 58 QA personnel.

- Quality assurance activities are documented in the recently approved (January 1989) "Tank Farm and Solid Waste Management Quality Assurance Program Plan". It provides specific guidance for the implementation of the 18 elements of NQA-1 as presented in the site-wide Quality Assurance Manual, WHC-CM-4-2.

- The principal means for involving employees at all levels in the plant safety objectives are the clear definition of individual safety responsibilities, active and consistent implementation of the Management Overview Programs, and the assignment of tasks within the "Quality Improvement Plans." Several managers reported that the Management Overview Programs, in particular, have resulted in improved housekeeping and employee attitudes.

- The WHC focus on changing employee attitudes towards quality and safety in the workplace, and the integration of safety and quality as coequal components of the WHC mission, is an appropriate approach to achieving long term improvement in site safety.

- The rate of change in work culture and working-level practices is determined by the ability of the working-level personnel to accept and adapt to the more detailed and formal new procedures. The Appraisal Team considers that all avenues for enhancing the change are being exploited by WHC.

- The excellence of the higher level manuals, and the strong commitment of managers to the achievement of program objectives, are direct evidence that the philosophy of top-down direction and bottom-up accomplishment and accountability is working.

* In several functional areas, operating capabilities and procedures were not in compliance with DOE and WHC standards. (See Concerns OP.2-2, MA.7-1, TC.1-2, TC.1-3, AX.2-1, TS.2-1, and RP.3-1.)

* There are no criteria for prioritizing the correction of operating procedures.

CONCERN: (OA.1-1) (H2/C2) Management has not assured the timely updating of operating procedures to comply with DOE requirements and WHC standards.

OA.2 MANAGEMENT OBJECTIVES

PERFORMANCE OBJECTIVE: Facility management objectives should ensure commitment to safe operation, including enforcement of work practices and procedures.

FINDINGS:

- o Specific, measurable management goals and objectives for the Tank Farm were prepared for calendar year 1989 based on broadly stated WHC policy commitments for disciplined and safe operations.

- o The Tank Farm "Quality Improvement Plan" records and tracks action items and objectives in areas where management has determined that improvement is needed. The items were assigned to individual managers and accomplishment was measured by timeliness and effectiveness of completion.

- o There is a high degree of consistency among the objectives of the Tank Farm "Quality Improvement Plan," the Tank Farm goals for 1989, and the implicit objectives of the Event Fact Sheet review process; and between those objectives and WHC Management Policies, and Management Requirements and Procedures.

- o An informal, hierarchical tracking system exists, within which each manager tracks and assesses progress for those items the manager considers significantly related to the facility objectives within the manager's scope of responsibility. Both interviews and documentation provided evidence of regular management assessment of progress against objectives and schedules.

- o Safety and quality performance data are included in the Tank Farm "Monthly Plant Performance Status Report," which is distributed to all Tank Farm managers, and routinely discussed at the monthly Tank Farm safety meetings with operating personnel. Selected data are posted at facilities where the major shift changes occur. The reports are also widely distributed to upper level managers, and the summary safety and quality data are discussed at the periodic Management Council meetings.

- o The understanding of, and commitment to, management objectives was high among all managers and most professional and bargaining unit personnel. Some professional and bargaining unit personnel remain skeptical of management's methods, motivation and degree of commitment to long-term improvement.

- o WHC management, in cooperation with DOE-RL, has committed to implementing a "Total Quality" approach to its management philosophy and policies. Through this approach, WHC aims to establish a positive safety and quality culture and to provide means to continually make improvements in the way work is done.

- o The Defense Waste Management Division has issued a Tank Farm "Quality Improvement Plan" Revision 1, dated March 16, 1989 which defines measurable performance objectives. Seventy-nine key improvement areas were identified for accomplishment in calendar year 1989. Each provides a means to improve the safety or quality of the Tank Farm operations as a whole. This is a new effort that will require adjustments before all employees embrace it.

CONCERN: None.

OA.3 CORPORATE SUPPORT

PERFORMANCE OBJECTIVE: There should be evidence of corporate interest and support for safe operations.

FINDINGS:

- Corporate interest and support for safe operations at the Tank Farm was evident by the existence and actions of several corporate committees and task forces that affect WHC.
- The Corporate Code of Conduct and the nature of corporate support and communication within WHC, indicate a high priority on safety and environmental performance.
- The WHC Board of Directors, consisting of senior corporate managers, meets quarterly at Richland for two days. The meetings include discussions with DOE-RL.
- Westinghouse Corporation has chartered a Government Operations Nuclear Safety and Environmental Oversight Committee, consisting of mostly non-Westinghouse people, to provide oversight at all Westinghouse-operated facilities. The broad charter emphasizes safety and environmental areas, and allows the committee to set its own criteria. A January 1989 visit by the committee focussed on the 200 Area at the request of WHC.
- The Corporate Manager of government owned, contractor operated (GOCOs) facilities, has established several task forces on issues of common concern to all GOCOs (e.g., environmental compliance and quality issues) to facilitate cooperation, coordination, and effective response .
- The President of WHC attends all staff meetings held by the Westinghouse Corporate Vice President for Government Operations.
- With DOE approval, WHC has drawn on Westinghouse corporate resources for needed specialized expertise.

CONCERN: None.

OA.4 MANAGEMENT ASSESSMENT

PERFORMANCE OBJECTIVE: Management and supervisory personnel should monitor and assess facility activities to improve performance in all aspects of the operation.

FINDINGS:

- o Achievement of safety objectives is clearly and consistently defined as a line management responsibility, with the Safety Organization providing oversight and support. The performance of specific safety-related responsibilities is routinely tracked and assessed by line managers.

- o The Senior Management Overview Program and the Tank Farm Management Overview Program provide visible evidence of management's interest in safety. This visibility, together with management attention and response to employee concerns expressed during the oversight visits, has resulted in management reports of visible improvement in housekeeping and employee attitude toward safety and quality in the workplace.

- o Selected safety data and trends are reported monthly in the "Plant Performance Status Report." Summary data from these reports are discussed in the Management Council meetings.

- o Supervisors and managers were being required to assure an Event Fact Sheet (EFS) is completed for any events that appear to be adverse to quality, safety or environmental protection and to distribute these EFSs in accordance with Management Requirements and Procedures, WHC-CM-1-3, MRP 5.14 Rev. 1 of March 25, 1988, entitled "Investigation and Reporting of Health, Safety, or Programmatic Events, and Unusual Occurrences."

- o EFSs are evaluated monthly by Tank Farm managers to identify causes of events, status of corrective actions and opportunities for improvement. The threshold for requiring the preparation of EFSs was recently lowered, resulting in a large increase in the number of events reported.

- o If an EFS meets the programmatic criteria for an Unusual Occurrence Report (UOR), the UOR is to be prepared in accordance with the procedure. An EFS not meeting UOR criteria, but requiring further evaluation to prevent recurrence, results in the preparation of a Critique. A Critique is treated in the same manner as a UOR except that it is not required to be submitted to DOE.

- o EFSs, UORs, and Critiques are tracked, reported and trended in the Quality Safety Trending (QST) System, along with other site data, (e.g., audit findings, non-conformance reports, inspection/ surveillance reports, and corrective action reports).

- o In addition to the QST System, other identified deficiencies are being tracked through: (1) the Housekeeping Overview Program Action Tracking System; (2) Management Overview Program Action Tracking System; (3) the Quality Improvement Plan and (4) the Tank Farm Plant Manager Action Tracking System.

- o Trending and root cause analyses are performed on several specific items in the data base, including EFSs, UORs, and Critiques.

- o Appropriate review and closeout of the action items is being performed. Senior management is routinely provided with trends and tracking system status for review.

- o The WHC system of manuals and procedures, coupled with training, is the principal means of disseminating safe operating information to employees. Although significant progress has been made in manual development and consolidation, many of the procedures developed by previous contractors have not been reviewed and brought into compliance with DOE and WHC standards. Some required procedures do not exist, and some operators do not have sufficient knowledge concerning the procedures and requirements. (See Concern OA.1-1)

- o The Quality Assurance (QA) Organization has established a program of audits and surveillances to assess the quality and safety of Tank Farm operations.

- * The QA Audit Program Administration Group has the responsibility to determine for WHC management the status and adequacy of the Tank Farm QA Program. Only one such audit has been conducted in the past two years (July - August 1988). The audit covered only four of the 18 elements of NQA-1, although the stated WHC goal is to audit all 18 elements within a two-year period.

- * Tank Farm management has relied on line personnel to conduct internal surveillances, and on quality control inspections and surveillances to provide independent oversight. These reviews are relatively narrow in scope, infrequent, or not conducted. (See Concerns AX.2-1, AX.5-1, AX.5-2, TS.4-1, RP.11-2, PP.5-1, and FP.5-4.) Inspectors limit their inquiries and questions to specific assignments, usually through strict adherence to their checklists. They satisfy the needs of the review system but do not adequately address the need for independent QA oversight.

CONCERN: (OA.4-1) (H3/C2)

Because of the low frequency of independent quality assurance audits, and the narrow scope of line and quality inspections and surveillances at the Tank Farm, WHC management is neglecting a useful source of information to enhance the quality and safety of the Tank Farm operations.

OA.5 PERSONNEL PLANNING AND QUALIFICATION

PERFORMANCE OBJECTIVE: **Personnel programs should ensure that positions are filled by highly qualified individuals.**

FINDINGS:

- o Personnel programs are not adequate to fill all positions on a timely basis with adequately qualified individuals.

  * All appropriate sources are being actively exploited for recruitment, including the corporate placement programs.

  * The recent reversal from an active out-placement program to an aggressive recruitment program will require time to overcome the perceptions of instability and low-economic potential that exist in the personnel market places nationwide. During this time, recruitment is likely to lag behind the need.

  * Managers expressed concern with the time required to hire a selected candidate. Varying opinions were expressed concerning the degree to which the length of time was determined by the security clearance process.

  * An in place and expanding training program is aimed at enhancing the non-technical skills of managers and professionals. Technical training does not fully meet WHC standards and requirements or DOE requirements. (See Concerns TC.3-1, TC.3-2, TC.5-1, TC.8-1, AX.4-1, ER.3-3, ER.3-4, TS.1-1, TS.7-2, PP.4-1 and FP.5-5.)

  * Programs to encourage upward movement of working-level personnel are non-existent. Career advancement programs are reactive, consistent with corporate policy that career enhancement is primarily the responsibility of the employee.

CONCERN: (OA.5-1) (H2/C1) Management has not been effective in assuring that all positions are being staffed by trained and qualified personnel.

OA.6 DOCUMENT CONTROL

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

FINDINGS:

- The document control system is designed to provide correct, readily accessible information to support facility requirements, but the system has not been fully implemented.
- Maintenance and control of documents that fall within the controlled manual system are the responsibility of the individual recipients. In most cases, the manuals were properly maintained and stored. Individual cases of inadequate maintenance and control were noted. (See Concern ER.2-2)
- A procedure and schedule for the systematic review and updating of Tank Farm Surveillance Operations Administration, WHC-CM-5-7 was an assigned action in the "Quality Improvement Program" scheduled for completion by June, 1989.
- SARs are not current. They are not in the prescribed DOE format and do not employ modern risk assessment techniques. (See Concerns TS.3-1, FP.5.5)
- Operating procedures are not all in compliance with current DOE and WHC standards. A requirement for review of 10 operating procedures per month was initiated by the Tank Farm Manager in February, 1989. Also, Tank Farm Plant Engineering is committed to upgrading 50 standard operating procedures per year over a four year period to make them conform with current operating procedure format. (See Concern OA.1-1)
- The document control system was essentially established upon completion of the transition phase of the WHC contract in September 1988, when upper-tier manuals from the previous contractors were completely replaced with WHC manuals. Some lower-tier procedures which were established by adopting previous contractors' documents, were being evaluated and improved or replaced. (See Performance Objective TS.3)
- The Quality Assurance (QA) Organization has the responsibility for assuring adherence to the document control system, for reviewing quality-related documents, for assisting in the development of procedures, and for regularly assessing the document control system.

* Both records management and document control are shared responsibilities between WHC Engineering and Boeing Computer Services, Richland, Inc. (BCSR). BCSR has been a WHC partner since the consolidation contract was let and has responsibilities defined in a Memorandum of Understanding dated 4/3/87.

* BCSR operates five storage areas at present (Bldg. 712, 400 Area QA Vault, 300 Area QA Vault, and Federal Building 3rd and 6th floor vaults). None of these facilities are in full compliance with NQA-1 requirements for storage. A new central facility is planned for construction in the 400 Area but will not be ready for occupancy until 1993.

* Quality Assurance Records storage is not in compliance with ANSI/ASME NQA-1-17. DOE-RL has granted WHC/BCSR a waiver from this requirement until 1993, when a new facility is to be completed in the 400 Area. The new facility is being designed for NQA-1 compliance.

* BCSR is also responsible for "Records Management Program," WHC-CM-1-3, MRP 3.3, and Records Management Manual, WHC-CM-3-5. The latter manual is still incomplete because it lacks a "Standard Filing System" procedure which is not scheduled for completion until 6/30/89. "Quality Assurance Records," Quality Assurance Manual, QR.17 is also scheduled for revision by 6/30/89.

* The Records Management Program, in accordance with DOE-RL 1324.1A/DOE 1324.2A, requires all managers to provide BCSR with a Record Inventory and Disposition Schedule, which should be updated annually. The Tank Farm is one of many organizations which have not yet complied with this requirement.

CONCERN: (OA.6-1) (H3/C1) Records management is not in compliance with the requirement of DOE-RL 1324.1A/DOE 1324.2A, and WHC-CM-3.5.

OA.7 FITNESS-FOR-DUTY PROGRAM

PERFORMANCE OBJECTIVE: A facility fitness-for-duty program should identify persons who are unfit for their assigned duties as a result of drug or alcohol use, or other physical or psychological conditions, and remove them from such duty and from access to vital areas of the facility.

FINDINGS:

- The scope of the facility fitness-for-duty program is considered appropriate.
- Managers are trained to identify and handle employees with substance abuse problems. They will receive additional advanced training, as well as periodic refresher training, beginning in about December 1989.
- A clearly written policy on substance abuse is provided in the Employee Manual given to each employee.
- Posters are prominently displayed to inform employees of the Employee Assistance Program that covers, but is not limited to, substance abuse problems.
- Chemical testing for drugs is done by urinalysis for all prospective employees, persons returning from rehabilitation, and voluntary submissions. Testing is also done for reasonable cause based on job performance, after concurrence at three levels of management.
- A computer based, interactive and video training program is being developed that will allow periodic individual training of all employees beginning in about September, 1989.

CONCERN: None.

B. OPERATIONS

There is a statement in the Tank Farm Charter that calls for assurance of full understanding and acceptance of performance requirements by personnel to ensure that all activities are conducted safely in accordance with procedures. Interviews with managers and operators indicated that the safety emphasis is well understood throughout the Tank Farm organizational chain, and use of procedures in conducting operational activities is mandatory. The Tank Farm Operating Procedure Control System appears to be effective.

The mandatory compliance aspect has contributed to identification and correction of errors in operating procedures. Operators finding incorrect steps in procedures are stopping work and generating approved temporary operating procedures before resuming work. Temporary operating procedures identified as a needed permanent modification for a procedure are being incorporated into a revision of the procedure on a timely basis. In addition, a recently instituted program to verify a selected number of operating procedures each month against the actual operations and equipment using a managerial walk-down will improve procedures. All operating procedures will receive this review once every 30 months.

However, there are two concerns related to procedures and the OSRs. Existing Tank Farm OSRs are being reviewed by WHC for current utility and applicability. The Appraisal Team review determined that there is not a consistent one-to-one correspondence between Surveillance Requirements and specified Limiting Conditions of Operations in the OSRs as required by accepted nuclear industry practice. These inconsistencies result in the OSRs not meeting the requirements specified in DOE 5480.5. Many required surveillances do not have safety significance because of these inconsistencies. In addition, a program is underway by the Tank Farm to incorporate current OSR requirements into operating procedures. Review of a limited number of these revisions in draft form indicated an inconsistent presentation of OSR material and references in the procedures which has potential for contributing to operator errors in the field.

Facility configuration is monitored from the controlled Equipment Routing Boards in the Tank Farm operation buildings. Configuration control has been improved since an equipment misrouting incident in December, 1988. A stricter verification and approval process is now in place to review equipment routing changes between tanks before transfers are started. A Job Control System (JCS) for repairs was instituted at the Tank Farm in January to control and document these activities. This system has improved configuration control by assuring correct configuration at the end of each job and by discovery of existing configuration errors, which are corrected.

However, JCS has also produced a third concern. Although JCS is well accepted by managers in the Tank Farm, it does require a great amount of time from Shift Managers and Plant Engineers for its administration. This detracts from performance of their normal assigned duties, and their overall administrative activities receive less than the full attention needed.

With the exception of these concerns, the Performance Objectives for Operations are being met satisfactorily. Operations are presently being conducted safely. The recently developed Tank Farm "Quality Improvement Plan" has improved and should continue to improve safety, if applied correctly.

OP.1 CONDUCT OF OPERATIONS

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

FINDINGS:

- o Operations are being managed and conducted in a safe and reliable manner. However, there is a concern that time spent in administering the new Job Control System (JCS) detracts from other assigned work duties.

- o Five operator interviews indicated that they thought their assigned daily workload could be accomplished safely and completed in the time allotted.

- o Observation of control rooms and areas indicated that business was conducted professionally and only those needing to be in the area were present, as mandated by procedure.

- o All operations are approved and authorized by the Tank Farm Operations Manager.

- o Facility policy requires that procedures be in hand when conducting operations, except under several specified circumstances, such as where operations are routine or simple, or where great proficiency has been demonstrated.

- o Procedures are printed on golden rod colored paper and are made readily available through placement by the Operations Data Management (ODM) Group in several operating areas throughout the Tank Farm. A review of ten randomly chosen procedures at one location showed that the correct revision number for each was in place. ODM personnel tour the facilities once each week, and more often as necessary, to place revised procedures in the books and remove out-dated ones. A new procedure index is issued each week. ODM performs random audits of procedure books for correctness and completeness. Procedures are not to be removed from the immediate area by operations personnel.

- o Based on a review of recent reports of off-normal conditions in operations as reported on Events Facts Sheets (EFS), there did not appear to be a pattern of repetitive errors. There were 153 EFSs filed in 1988 and 32 in the first three months of 1989. Most documented various equipment malfunctions. For 1988, 14 percent of EFSs were upgraded to Critiques and four of these were rated as Unusual Occurrences. Most of the recent Unusual Occurrence Reports (UORs) were involved with unexpected, elevated releases in waste

streams from PUREX (higher releases of ammonia and radioactive iodine), suspected leaking single shell tanks, or OSR surveillance violations. (See Performance Objective OP.2)

- o In the cases of UORs and other serious shutdowns, readiness reviews are completed to requalify the operations for startup, and approvals are obtained from WHC management and DOE-RL.

- o An internal surveillance program is in place which assists shift managers in identifying and correcting operating problems while remaining within the bounds of operating limits.

- o Tank Farm management has developed a draft procedure entitled "Conduct of Operation" which will be issued soon. This document was reviewed and found to define authorities, policy, operating controls and operating work rules. The Operations Staff has already received training on its proposed content which is being applied.

- o Planning and scheduling are done within the Tank Farm Operations Group. Extended schedules, and weekly schedules, with manpower estimates, are developed. A scheduling group meets every afternoon to assign operators and craftspersons to the various activities to be conducted in the next 24 hours. This was observed to be a very businesslike activity.

- * Independent interviews with four Shift Managers, and three Plant Engineers (Facility Representatives) indicated that a major portion of available time was now taken up in coordinating JCS work packages. They estimated that up to 75 percent of their time was spent on this activity. Shift Managers reported that JCS activities had added to their administrative duties and they were not able to be in the field observing operators as much as they would like. For Plant Engineers, the JCS duties detracted from performance of their normal assignments, and some of their activities receive less than the full detailed attention needed.

CONCERN: (OP.1-1) (H2/C2) The amount of time required by Shift Managers and Plant Engineers to administer the Job Control System negatively impacts the performance of their assigned duties. (See Concern OA.5-1)

OP.2 OPERATIONS PROCEDURES AND DOCUMENTATION

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

FINDINGS:

- Procedures and documents support safe operations except in the area of OSR definition, identification, and procedure presentation.
- The preparation, review, approval and revision process for operating procedures is the same as that observed by previous Appraisal Teams at the Plutonium Finishing Plant (DOE/EH-0065) and PUREX (DOE/EH-0068). Concerns developed in those appraisals have been addressed and the Operations procedures at the Tank Farm were judged to be effective in supporting safe operations, with the exception of the OSR concerns noted below.
- "Operational Safety Documents" (OSDs) have been developed to provide documentation of operational limits for the Tank Farm operations. OSDs are employed to monitor operations within OSR limits and provide criteria for operating procedures. The OSDs present a safety-base specification traceability matrix identifying the source of each bounding safety limit (e.g., SAR, OSR, Regulation, or specific standards), each safety-based specification, the applicable implementing procedure, and the required record or documentation showing OSD compliance (e.g., a data sheet). These documents were reviewed and found to be adequate to support safe facility operations. Operations personnel stated that they refer to these documents as needed to reinforce their knowledge.
- Several tank-to-tank transfer procedures were reviewed. These contained adequate information to perform the operations. There was considerable cross referencing between procedures, but this is necessary so that a general and a specific transfer procedure can be used together, rather than developing a lengthy procedure for each possible transfer route. Interviews with operators indicated that some procedures are somewhat complicated but problems are resolved in their training and by assistance of their supervisors. Operators are required to have copies of all referenced procedures in hand when setting up transfer routes between tanks.
- Operating procedures are printed on easily recognizable golden rod colored paper.
- Specific, appropriate safety information is given in the front of each procedure.

- New process procedures are developed in parallel with design and procurement activities. These procedures receive a Readiness Review and facility walk-down, to verify their applicability, before the process is operated.

- Changes to procedures are controlled by a Procedure Change Authorization (PCA) which requires Operations and Plant Engineering approval before taking effect. PCAs have a lifetime of 60 days and may be designated as temporary or permanent. They are printed on pink paper and are easily identified. Temporary PCAs are removed from the procedures book by the Operations Data Management Group, upon expiration.

- A check of five permanent PCAs in the procedures book found no expired PCAs. A random check of a similar number of expired PCAs showed that the next revision/modification of the procedure had been issued, was in the procedures book, and the PCA had been removed. Another check of 10 randomly selected procedures showed the correct revision/modifications were in the procedure book.

- The method of assuring operator knowledge of revised procedures and PCAs is discussed under Performance Objective OP.5.

- Supplemental operating information and operator aids are controlled as discussed in under Performance Objective OP.7.

- Records of fissile material content in the tanks are maintained by Tank Farms Plant Engineering (TFPE), and the content of individual tanks can be assessed as needed.

- Most routine operating data (e.g., pressures, temperatures, levels, etc.) acquired in Tank Farm operations are sent to TFPE for review and distribution for trending, which could lead to procedure and equipment modification or revision. (See Performance Objective TS.5)

- Tank Farm Operations and TFPE have several programs in progress to improve the procedures. They are: deactivation of unused procedures, walk-down comparison of procedures with equipment and operations, conversion of procedures to the WHC format, and incorporation of applicable OSR references. Most unused procedures have been deactivated.

- About 10 procedures per month are selected and sent to Tank Farm Operations for walk-down verification. This effort is spread out among the Shift Managers, and their findings and comments are returned to TFPE. Procedure revision or modification is then started to make the needed changes and reformat the procedures, as

necessary. As a continuing aspect of this program, each procedure will receive a walk-down verification every 30 months. In addition, 40 other procedures for the most used transfer routes are currently being reviewed for needed corrections.

* DOE 5480.5 Section 8.d. requires that the environment, safety and health program for nuclear facilities include: "Operational Safety Requirements setting forth the approved limitations of safety operation. The requirements shall be concise and commensurate with the potential risks involved."

* OSRs, in their present form, are not entirely appropriate for the various operations performed at the Tank Farm. Many of the existing OSRs were developed prior to the development of criteria by WHC. An additional factor that impacts the OSR system is the multiplicity of SARs covering various operations and facilities at the Tank Farm. Consequently, the existing OSRs are a mixture of elements, including some which should not be OSRs and omitting others which should have been covered by OSRs. Similar Findings were made in the Plutonium Finishing Plant TSA in 1987 (DOE/EH-0065).

* The guidance provided in WHC-CM-4-46, Section 5.0, for preparing OSRs does not clearly define Surveillance Requirements (SR) as a type of OSR as required by DOE-RL 5480.5; SRs are a component of OSRs. The guidance, also, does not reflect the current acceptable format for preparing OSRs (Technical Specification equivalent).

* Many of the OSRs, as defined in the SARs, do not represent measurable limits for safe operation of the Tank Farm as required by WHC-CM-4-46, Section 5.0.

* Some of the OSRs contain Limiting Conditions for Operation (LCO) without SRs necessary to show LCO compliance. Other OSRs contain SRs without an LCO to support the need for surveillance. There should be a one-to-one relationship between LCOs and SRs.

* The definitions of terms for an OSR as given in WHC-CM-4-46, Section 5.0, are not consistent with the definitions for those terms as given in the reference regulation, 10 CFR Part 50.36. (DOE 5480.5). These differences may be causing some of the inconsistencies observed in OSRs for the operations and facilities at the Tank Farm. Some OSR requirements are surveillances which do not have an OSR safety significance. However, failure to complete a required surveillance results in an Unusual Occurrence Report.

* An OSR Action Plan has been initiated as a result of the OSR problem at PUREX in December, 1988. One of the planned actions calls for review of all OSRs for appropriateness and incorporation

into associated operating procedures. This effort by a multi-disciplinary task force is proceeding in the face of the findings presented above. OSRs are being examined in packages defined by the facility to which they apply. DOE-RL has already signed off on changes in OSRs for single shell tanks and double shell tanks. The recommendations for keeping, modifying or eliminating each present OSR are being documented.

CONCERN: (OP.2-1) (H1/C1) The current OSRs do not meet the requirements for OSRs given in DOE 5480.5 or in accepted nuclear industry practice. (See Concerns OA.1-1 and TS.3-1)

FINDINGS:

* Efforts have been started to incorporate existing OSRs into procedures. New data sheets (yellow) will also be developed for recording OSR related data to provide instant comparability of readings with limits. No proposed OSR data sheets were developed for review during this appraisal.

* The format for incorporation of OSR requirements into procedures is presented in a WHC procedure format guide, WHC-IP-0240. This guidance allows wide latitude in formatting OSRs in procedures. Such latitude is judged to be inappropriate for OSRs.

* Two draft procedures for incorporating OSRs were reviewed: TO-200-030, "AY and AZ Airlift Circulator Operation" and TO-025-001, "Perform Tank Farm Transfers-General". These were the only two procedures made available. The presentation of OSR information was inconsistent between the two procedures and in neither case was presented as specified by WHC-IP-0240. The airlift procedure provided a better insight into the OSRs in the up-front Safety Section. The other procedure made the OSR information available at the associated procedure steps.

CONCERN: (OP.2-2) (H1/C2) Present inconsistencies in incorporating OSR information into procedures could create errors or misunderstanding when applied by Operations Staff.

OP.3 FACILITY STATUS CONTROLS

PERFORMANCE OBJECTIVE: Operations personnel should know the status of the systems and equipment under their control and should ensure that systems and equipment are controlled in a manner that supports safe and reliable operation.

FINDINGS:

- o Systems and equipment status are monitored effectively by facility management.
- o Routing Boards for all Tank Farm equipment (piping, valves, tanks) are kept up to date in the Tank Farm operation buildings (200 East Area and 200 West Area). Additional methods and processes have been put in place recently to improve configuration control for the Tank Farm.
- o In January, 1989, the Job Control System (JCS) for repairs was initiated in Tank Farm operations. Performance of activities under JCS has improved configuration control since the process assures desired configuration at the end of the repairs, and also has discovered out-of-configuration elements which were corrected.
- o Owing to a minor consequence misrouting of a batch of liquid in December, 1988, the procedures to set up valving and flexible piping connections for routings were revised to add another level of verification, and replace administrative verification with physical verification of valve positions. Now, after the routing has been set up by an operator, a team of four persons enters the Tank Farm to verify the routing. The team consists of another operator, a quality control (QC) representative, the Shift Supervisor and the Area Operations Manager. Each signs off the steps in the procedure as the verification continues, and also signs off on the routing diagram in the procedure, with appropriate dates and time. The routing is also recorded on a transfer sheet with verification signatures. The routing change is set up on the Routing Board and documented by two signatures on the transfer sheet.
- o Approvals for the transfer require the signature of the Tank Farm Manager, who provides an independent review for the completeness of the routing verification. He may delegate the approval.
- o Random checks of five transfers made in the last three months showed that signed-off procedures corresponded to associated transfer sheets.

- There is an ongoing, overall Tank Farm review of all components to establish the normal configuration for all valves to assure that valves not directly involved in a transfer route are in the proper configuration to prevent flow to interconnected tanks.

- The December misrouting occurred as the result of a failure to verify a valve position. The valve was tagged as being closed, was locked, and was QC sealed. However, the valve was actually open. Procedures have been changed to require all such valves to be unlocked and checked for actual positions during routing setups.

- There are about 30 dedicated routings set up on a permanent or semi-permanent basis to allow transfers between various waste sources to active receiver tanks. These routes are documented and approved. Transfers are approved as previously noted but configurations are verified from the Routing Board. The list of dedicated routings is reissued whenever a change is made.

- Data readings are taken each 8-hour shift, daily and weekly of tank liquid levels, tank temperatures, leak detection pit liquid and radiation levels, tank vacuum levels, exhauster radiation levels, and annulus radiation levels (double wall tanks). These are reviewed for obvious changes and against OSR limits. They are then sent to Tank Farm Plant Engineering for review and subsequent trending (See Performance Objective TS.5). Such information indicates whether liquid levels are changing (suspected leakers) or other changes are occurring.

- Periodically, radiation levels in vertical dry wells exterior to the tanks are monitored for changes, cores are removed from the salt cakes in the tank interiors for evaluation of conditions, liquid samples are taken, and in-tank photography is conducted to assess changes in the tank interiors.

- Adherence to the limiting conditions of OSRs is being stressed in Tank Farm Operations. (See Performance Objectives OP.2 and OP.5)

- For OSR and other safety-related equipment, the JCS requires special verification of performance before the equipment is placed back in operation.

- Locks and tags are under procedural control that requires logging of placed locks and tags and monthly audits of lock and tag locations. Tags are numbered and dated appropriately and lock numbers are entered in the log with the tag number. The log indicates the location of the tag and the date placed. Red and white danger tags and yellow control tags are used. Random checks of seven tags listed in the log of the evaporator facility showed

they were all in their specified locations with correct placement dates, and the correct lock numbers were found with the danger tags.

- o Shift logs are sufficiently detailed to provide the pass through information needed for safe operations of equipment.

- o Observations in control rooms and control areas showed a minimal number of alarms activated during normal operations. Instruments were observed to be free of out-of-tolerance or out-of-service tags. Backup methods are available for data acquisition in the absence of primary instruments, particularly for OSR-related equipment.

- o A tickler system is employed to conduct weekly, semi-monthly, and monthly surveillances, and other routine activities. Some OSR surveillances are included. From an audit of random items, for 1988, the system was more than 98 percent effective. Most not completed-on-time activities were caused by weather or failed equipment which was reported for repair.

- o The normal operating status of the plant is monitored effectively by the Shift Manager. A computer link is being developed to provide a means for the Shift Manager to be informed of the up-to-the-minute status of JCS activities in his area.

CONCERN: None.

OP.4 OPERATIONS STATIONS AND EQUIPMENT

PERFORMANCE OBJECTIVE: Control stations and facility equipment should effectively support facility operation.

FINDINGS:

- o The control stations and facility equipment observed are effectively supporting safe facility operations.
- o Some Tank Farm equipment was designed and installed over 30 years ago. The installation of double shell tanks, starting in the late 1960s, has significantly improved the reliability and safety of the newer tanks and their supporting equipment. Methods have been implemented to successfully stabilize and isolate older single shell tanks.
- o Equipment and supplies needed for day-to-day operations are readily available at supply rooms in Tank Farm offices (200 East Area and 200 West Area) and from central stores.
- o Necessary plant communications coverage is provided by telephones between control rooms, control areas and the Shift Manager's office. Operators in the Tank Farm areas are also in radio contact as are Radiation Protection Technologists. An outdoor public address system is not in place.
- o Plant equipment in control rooms and areas for controlling and/or monitoring operations was observed to be accessible to operators. Operations equipment in the Tank Farm is at ground level.
- o Sturdy metal stairs and decks were observed for supporting the upper elevation operations in the East and West Area Evaporator facilities. Mobile cranes are employed in the field for removal of pit and hatch covers and for moving other Tank Farm support equipment.
- o Labels were observed on most equipment. However, exterior equipment is subjected to severe weather, and tags and labels are lost. Missing tags and labels are noted during periodic, scheduled field and housekeeping inspections and work orders are initiated to replace them.
- o Extreme housekeeping measures are employed. A draft procedure (to be issued shortly) controls the housekeeping inspection process very tightly and its requirements are currently being applied. Each operating crew is responsible for their assigned area. Selected areas are inspected and rated weekly by Tank Farm

Operations Shift Managers. Review of several recent 24-item checklists showed no identified housekeeping problems. Facility managers also make monthly inspections of randomly selected facilities and a list of items is compiled for cleanup or repair action.

CONCERN: None.

OP.5 OPERATOR PERFORMANCE

PERFORMANCE OBJECTIVE: Operator knowledge and performance should support safe and reliable operation of the equipment and systems for which he is responsible.

FINDINGS:

- o Operator knowledge and performance adequately support safe and reliable operations.
- o Operator knowledge of assigned duties and responsibilities was evident. Interviews with five operators elicited a unanimous response that procedure compliance was mandatory and that safety in their activities was the number one emphasis of management.
- o Interviews with three supervisors resulted in expression, with little reservation, of their confidence in the ability of operators to do their assigned jobs safely and correctly. Supervisors stated that they are careful to assign operators only to those duties for which they were certified. Supervisors stated that they assigned operators to duties based on their confidence in an operator's ability to perform reliably and safely.
- o Operators apply their basic training in radiation principles, industrial safety, process fundamentals and other disciplines in their specific on-the-job training (OJT) under the supervision of other operators who are certified as OJT trainers. Operators are tested in their walk-through (practical) examination on their ability to detect, diagnose, and correct abnormal operating conditions. Experience in operating the systems provides greater understanding as contrasted to that gained from classroom training, such that proficiency is developed.
- o Operators are authorized to stop or shut down equipment or operations when faced with a real or perceived abnormal or emergency situation. Operators are not authorized to change the normal status of operations without management approval. All operator work requirements and prerogatives are spelled out in a new "Conduct of Operations" procedure expected to be issued soon. Fortunately, there is sufficient inertia in most Tank Farm systems to allow mitigating actions to be taken in a reasonable time without significant safety upsets in abnormal situations.

- o In the course of performing their duties, operators have identified errors in procedures, stopped work, and reported the conditions to their supervisors. Procedure Change Authorizations (PCAs) are generated and approved to allow work to continue, and to correct the procedure.

- o Operators, supervisors, and managers read the latest revision of procedures (new or revised) and PCAs each day as they are posted. This is to be done early in the shift. The acknowledgement of having read and understood the revision is made by signing the sign-off page attached to the procedure or PCA. The Shift Managers review the signatures to assure that all those required to know the procedures have become acquainted with them. Review of the signature sheets indicated that operators were becoming familiar with these changes in a reasonable time period (one week) after the date of issue.

- o Supervisors work with operators in the Tank Farm and are present to provide assistance and answer questions as needed.

- o The problem at PUREX in December 1988, in relation to an OSR violation, resulted in training of operators at the Tank Farm to heighten their awareness of OSRs. Their understanding of the purpose and application of OSRs was increased. This was evidenced by five operators who were able to describe, in interviews, the use and basic requirements of OSRs.

- o Some operators are aware of lessons-learned in industry. In the near future, management plans to introduce a required reading course for operators, of which lessons-learned will be a part. This process will be controlled by a procedure currently being drafted.

- o During interviews, operators expressed interest and enjoyment in their work.

- o An operators' safety meeting was not held during the appraisal so an estimate of its worth or content could not be made.

CONCERN: None.

OP.6 SHIFT TURNOVER

PERFORMANCE OBJECTIVE: Turnovers conducted for each shift station should ensure the effective and accurate transfer of information between shift personnel.

FINDINGS:

- o Shift turnovers by Operations personnel are being performed satisfactorily.
- o The primary part of the shift turnover occurs between the Shift Managers. Observation of the process showed that the office door was closed and posted for turnover in progress. The turnovers between the managers proceeded in quiet surroundings without interruptions. The incoming manager prepared for the turnover by reading the extensive entries in the permanent log book made since his last shift. He initialed his review. Both Shift Managers then discussed pertinent items such as repairs and maintenance in progress, off-normal operating conditions, and operations to be conducted on the next shift. Observed turnovers were conducted professionally.
- o Similar turnover activities occur in the East and West Area Evaporator Control Rooms, the Computer-Automated Surveillance System Alarm Center, and the A Tank Farm Complex Control Room between departing and arriving operators. Again log books, situations, and work-in-progress are noted and discussed. Operators also review the status of alarms on the panels.
- o Overlap time of up to 30 minutes is scheduled for turnover. Time allocated to accomplish turnover was judged to be adequate.

CONCERN: None.

OP.7 HUMAN FACTORS

PERFORMANCE OBJECTIVE: Human factors considerations should be evident in the design of systems, controls, and displays to facilitate the observation and interpretation of instruments, alarms, and other information, and the operation and maintenance of equipment.

FINDINGS:

- o The human factors items observed were considered satisfactory.
- o In manned control centers, alarm panel titles and color codes were consistent in presentation and layout and were easily understandable.
- o Operators are able to differentiate by color between indicators for status and for alarms. Light panels are color coded white for operational alarms, yellow for failures, and red for elevated radiation levels.
- o Audible alarm sounds are similar and alarms are differentiated by the flashing of color alarm panels. Planning is underway to provide distinct audible identification of severity to improve the operator's ability to distinguishing between alarms.
- o Labeling of most equipment and instruments is consistent and understandable. Panels in the older areas of the Tank Farm are not as consistent in layout owing to different methods employed in their design.
- o Markings on equipment, instruments, and piping were visible. A periodic inspection is conducted to examine clarity of labels and changes are made as needed.
- o Very few operational aids (such as procedure summaries and sketches) were seen posted in control rooms and areas. A draft procedure, to be issued shortly, has been developed to control operational aids. Among other things this procedure requires these aids to be approved, logged, legible, numbered and dated, and referenced to procedures, where applicable.
- o Interior work areas were observed to be very well lighted. Outdoor Tank Farm areas were not observed at night to judge lighting levels, but levels are checked periodically in the Tickler System surveillances and lights are replaced as needed.
- o No restricted clearances were observed.

CONCERN: None.

C. MAINTENANCE

The overall judgment of the Tank Farm maintenance activity is that adequate and safe practices and procedures are being employed. Work is being scheduled, authorized, performed, documented and recorded in a manner that is in essential compliance with WHC maintenance practices and procedures. Personnel at all levels, from management to craftpersons and technicians, displayed an interested and attentive attitude toward their jobs. Overall morale was high, but concern was expressed over the new Job Control System currently being implemented and the extensive time required to process work packages.

At the time of this appraisal, three systems were being used to schedule and conduct maintenance activities. These are the Process Instrumentation Surveillance, Calibration and Evaluation System (PISCES), the Preventive Maintenance (PM) system and the work order Job Control System (JCS). PISCES and PM are used for scheduled calibration and maintenance activities and the JCS is used for repair and corrective maintenance. An effort is being made to incorporate the PM system into PISCES so that all scheduled maintenance activities are included in one system. Because of the large number of activities included in PISCES (approximately 600 to 800 monthly) some errors have been noted in the job cards used to schedule and guide calibration and maintenance activities.

The JCS has recently been adapted for the Tank Farm and some of the crafts people and technicians are not fully familiar with the system. This has caused some maintenance work holdup. When fully implemented, the JCS will provide a good system for handling and tracking equipment repair and corrective maintenance activities.

Extra effort is required to improve the information provided on the PISCES job cards. There are instances of incorrect procedures being specified and incomplete information being provided on the job cards. Continuing close attention by the cognizant engineer and/or the Calibration Control Authority is required to assure that the PISCES job cards are correct and that current information is provided.

MA.1 MAINTENANCE ORGANIZATION AND ADMINISTRATION

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

FINDINGS:

- The organization and responsibilities for the Tank Farm maintenance activities are in place and clearly defined in "Organization and Responsibilities," WHC-CM-8-2 Section 101 and WHC-CM-8-7 Section 124. Organizational charts are available depicting the group managers, shift supervisor, technicians and craftspersons. Guidelines, indicating requirements in the form of generic duties for the Tank Farm maintenance activities are provided.

- Administrative controls are in place to assure safe and reliable maintenance activities. There are high contamination levels at the site and a high potential for personnel contamination during maintenance activities at the Tank Farm. Individual work performance of technicians and craftspersons in the maintenance, radiation protection and process areas is credited with minimizing the number of personnel contamination incidents that have occurred.

- Evidence of award programs for safety, quality improvement and new ideas are present in the maintenance shop and office areas. Regular meetings are also held to encourage improved safety and quality.

- Maintenance performance indicators are provided on a regular basis in the form of maintenance and calibration action overdue lists, and completion lists; ALARA and radiation exposure reports; and reports of lost workday cases, first-aid cases and OSHA recordable accidents.

- The authority, responsibility and accountability of each support group, and its interfaces with other groups, are defined in "Organization and Responsibilities," WHC-CM-8-2, Section 101, and "Administrative Guidelines," Section 102. These organizational roles are clearly understood by senior and group managers as well as supervisors. However, organizational roles and responsibilities are not well understood at the technician and craftsperson level.

- Staffing is inadequate to accomplish the amount of work indicated by authorization documentation in the three systems affecting maintenance activities. These systems are the Process

Instrumentation Surveillance, Calibration and Evaluation System; the Preventive Maintenance system; and the work order Job Control System. (See Concern MA.3-1)

CONCERN: None.

MA.2 FACILITY MATERIAL CONDITION

PERFORMANCE OBJECTIVE: The material condition of components and equipment should be maintained to support safe operation of the facility.

FINDINGS:

- o Inspection tours of the 241 A, AX and AY Tank Farm Areas as well as the maintenance shops in Bldgs. 272AW and 272WA showed that most equipment serviced by the Maintenance Group was in good working order and had received appropriate lubrication and maintenance.

- o Scheduled maintenance and calibration is provided with the Process Instrumentation Surveillance, Calibration and Evaluation System (PISCES) and Preventive Maintenance (PM) recall systems. Visual inspection and walk-throughs are scheduled to assure proper equipment operation.

- o Instrumentation and controls on the Tank Farm are generally housed in metal cabinets or buildings. Inspection of these items indicate that they have received scheduled maintenance and calibration.

- o Inspection of the flowmeters used periodically to indicate gas flow behavior are clean and in operable condition.

- o Some of the secondary liquid level measuring systems are no longer operative due to disintegration of the plexiglass material from which they were constructed. These are being replaced on a scheduled basis with new improved stainless steel systems.

- * Some of the instrumentation items placed in the outdoor metal cabinets are not designed for outdoor or wide temperature range weather conditions. Electric heaters are generally provided in these cabinets to assure proper temperature for operation of these instruments.

- * In the 241 A, AX and AY Tank Farm Areas, many of the metal cabinets housing the instrumentation and equipment are not weather tight. Inspection of these cabinets shows that, in some cases, gaskets and seals are missing or are no longer serviceable and that large holes in the cabinets exist.

- * Some of the instrumentation and equipment in the metal cabinets is dirty and corroded. This includes exhauster stack monitoring instruments, some of which are classified as OSR equipment.

- * Because of the absence of effective predictive maintenance activities, adequate preventative maintenance is not being provided

to the metal cabinets and other equipment, instruments and systems at the Tank Farm.

CONCERN: (MA.2-1) (H2/C2) Inaccurate readings from the exhauster stack monitors, liquid level monitors and radiation level monitors, as well as erroneous alarms, may occur as a result of weather conditions.

MA.3 CONDUCT OF MAINTENANCE

PERFORMANCE OBJECTIVE: Maintenance should be conducted in a safe and efficient manner to support facility operation.

FINDINGS:

- o Maintenance activities at the Tank Farm are under the control of the Facility Operations Group and are performed by the Maintenance Group. A release must be obtained from the Facility Operations Group before work can start. Maintenance activities are scheduled, recalled and performed in accordance with the Process Instrumentation Surveillance, Calibration and Evaluation System (PISCES), Preventive Maintenance (PM), and Job Control System (JCS), which specify the requirements for safe performance of the activities.

- o Maintenance personnel exhibited an interest in their work and a strong desire to provide quality workmanship. All expressed a strong desire to correct deficiencies, to conduct their activities in a safe and efficient manner, and to minimize personnel radiation exposure.

- o During a tour of the 241 A, AX and AY Tank Farm Areas appropriate checks were made by the Radiation Protection Technologist to assure that no person was subjected to unacceptable radiation levels and that proper precautions were taken to prevent the spread of contamination outside of the Tank Farm area.

- o Maintenance personnel are knowledgeable of lessons learned from past facility and industry experience and are kept informed by the circulation of Nuclear Regulatory Commission bulletin routings, weekly meetings, and training sessions associated with general safety requirements for the 200 Area support personnel.

- o Shift turnover meetings are informal and much information is passed verbally. The lack of formal briefings and written shift notes creates a potential for misunderstanding that could result in incorrect maintenance repair and safety consequences and/or in personnel exposure to radiation and hazardous materials.

- o In some instances, work documents and approvals are incomplete and/or incorrect. Work packages were observed during this appraisal that indicated incorrect procedures, or failed to specify the work procedure to be used.

- o Lock and tag procedures were not evident and work documents did not clearly specify the proper valve, breaker or jumper alignments.

These items are important in assuring that proper transfers of waste are made. There was considerable discussion regarding the checks made of these alignments, but no formal checklist or documentation was provided to show that these checks are actually made. No log books were available to demonstrate that documented redundant checks were authorized and performed.

* The scheduling and tracking of maintenance activities is accomplished with the PISCES and PM systems. There are an excessively large number of maintenance activities (approximately 600 to 800 per month for the 200 Area Tank Farm). There is no evidence that the data base for these maintenance activities is periodically reviewed for accuracy and applicability.

* The large number of maintenance items indicated by the data from the PISCES and PM systems represents an excessive workload for the Maintenance Staff. This workload adversely impacts their ability to service the large numbers of instruments and equipment.

CONCERN: (MA.3-1) (H2/C2) Equipment performance cannot be assured due to inadequacies in procedural controls and manpower for maintenance and calibration activities.

FINDINGS:

* Once a given instrument or piece of equipment is logged into the PISCES or PM system, the cognizant engineer or Calibration Control Authority (CCA) is no longer involved and is not required to track performance unless a work request is prepared for the item because of failure or need for repair. Our assessment indicated that there is no assignment of responsibility to the Maintenance Group, the Maintenance Engineering Group, or the Operations Group for tracking performance of these instruments and this equipment. There is not a scheduled periodic review of the performance of the instrumentation and equipment by the cognizant engineer or CCA to assure proper operation and to evaluate trends and performance history.

CONCERN: (MA.3-2) (H2/C2) Proper and updated requirements for instrumentation and equipment are not provided by the cognizant engineer.

MA.4 PREVENTIVE MAINTENANCE

PERFORMANCE OBJECTIVE: Preventive maintenance should contribute to optimum performance and reliability of systems and equipment important to facility operation.

FINDINGS:

- o A Preventive Maintenance (PM) program is in place for the 200 Area and is presented in WHC-CM-8-2 Section 502.0. WHC-CM-8-7 Section 204 describes the types and Impact Levels of PM. Efforts are being made to incorporate the PM system into the Process Instrumentation Surveillance, Calibration and Evaluation System (PISCES).

- o The requirements for PM are defined by the cognizant engineer or Calibration Control Authority with the approval of the Operations Engineer. The data base for PM is maintained by the 200 Area Maintenance Engineering Group.

- o Scheduled PM services are provided by the Tank Farm Maintenance Group with the approval of the Operations Group.

- o Job cards are issued by the Maintenance Engineering Group to schedule PM activities. The information presented on these cards provides a brief description of the maintenance activity, as well as the Impact Level, frequency, PM number, due date and last performed date.

- * Scheduled evaluation of the effectiveness of the PM program was not evident. Some history files were maintained, but no evidence existed that this data was actively being used for trending and predictive maintenance activities.

- * Due to the absence of trending efforts and predictive maintenance techniques and considering the efforts to reduce the PM data base by incorporation into the already overloaded PISCES, the quality of PM at the Tank Farm will not be improved.

CONCERN: See Concern MA.2-1.

MA.5 MAINTENANCE FACILITIES, EQUIPMENT, AND MATERIAL

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

FINDINGS:

- o The maintenance facility at the East Tank Farm (272 AW) is cramped and provides inadequate workspace. Because the shipping and receiving dock is in the same location, the area is congested and must accommodate materials and equipment in transit, as well as the materials stored and used by the Maintenance Group.
- o The maintenance facility at the West Tank Farm (272 WA) is adequately sized for the work being performed. This maintenance shop is well organized and can support a substantial maintenance effort.
- o A brief inspection of the tools and machines in the East Area showed that much of the equipment is old and beyond its useful life. In addition, many of the special hand tools (i.e., crimpers, benders, and similar tools) need to be replaced.
- o Although space is limited, the East Tank Farm Area was clean and well organized with the exception of the electronics area, which needs general housekeeping.
- o The welding area was small but well organized and in compliance with the requirements for performing safe and effective welding activities. Welder certifications and procedures were evident.
- o Instruments being used in the maintenance electronics shops showed current calibration status tags.
- * There was no evidence that a controlled storage area existed for quality-controlled items as required by NQA-1. This condition was noted throughout the 200 Area.
- * Acceptance inspection of material prior to storage is generally performed at the Richland site-wide receiving location where it is segregated and stored. After shipment to the maintenance facility (272 AW and 272 WA), the material is essentially uncontrolled and is not segregated.

CONCERN: (MA.5-1) (H2/C2) Quality-controlled items are not properly segregated and stored at the Tank Farm shops.

MA.6 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.

FINDINGS:

- o The work control system provides means to determine if the maintenance activity has been performed as required. Three systems are used to control maintenance activities; the Process Instrumentation Surveillance, Calibration and Evaluation System (PISCES), Preventive Maintenance (PM) and the recently instituted work order Job Control System (JCS). PISCES is oriented towards the maintenance, calibration and surveillance of instrumentation and the PM system toward preventive maintenance. Equipment repairs are controlled using the JCS.

- o Priority levels are assigned to maintenance activities and are indicated in the form of a designated priority level or completion due date.

- o Management controls are in place to identify the status, schedule, and any delinquent or overdue maintenance activities. This information is provided by reports issued from the PISCES and PM date bases.

- o Planning and scheduling of maintenance activities is performed by an operations planner and all maintenance activities are coordinated with the process operators. Appropriate authorizations are required before work can proceed.

- o Repair of defective equipment is performed in accordance with work orders issued under the JCS. With this system, adequate instructions, reviews and authorizations are provided to assure proper conduct of the maintenance activity.

- o The concept of ALARA is emphasized and radiation protection and monitoring is provided for maintenance activities.

- o Documentation and post-maintenance requirements are not clearly defined. Inspection of some of the PISCES records indicated that insufficient data has been taken and that, in some instances, incorrect procedures are specified.

- o No evidence was found to indicate that post-maintenance review of the maintenance data and inspections was conducted. Appropriate

signatures acknowledging satisfactory completion of the maintenance are required before returning the equipment to active status.

CONCERN: None.

MA.7 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 effectively.

FINDINGS:

- o Procedure notebooks for use by maintenance personnel were available in the maintenance office. An extensive list of Process Instrumentation Surveillance, Calibration and Evaluation System (PISCES) calibration procedures was also available in the maintenance office.

- * Procedures and reference documents indicated in the PISCES and Preventive Maintenance (PM) data bases are, in some cases, incorrect. In some instances, procedures and other documentation (e.g., equipment descriptions, drawings, vendor data, and specifications) are not available. This is particularly true for the Grout Treatment Facility.

- * A brief review of the PISCES job cards and available procedures indicated the following:

  - required approvals are inconsistent,
  - changes were made without approval,
  - multiple procedures govern the same activity,
  - no method exists for feedback and field change approval,
  - there was no indication of compliance with NQA-1 relative to hold points and other similar approvals, and
  - safe work loading on top of the storage tanks was not specified in some procedures.

- * Vendor manuals, drawings and other similar reference material was not available in the maintenance area.

CONCERN: (MA.7-1) (H1/C2) There is a lack of control of procedures, documentation and reference materials for maintenance activities in the Tank Farm.

MA.8 MAINTENANCE HISTORY

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

FINDINGS:

- o The only identified sources of maintenance history information were the Process Instrumentation Surveillance, Calibration and Evaluation System and Preventive Maintenance data bases maintained by the Maintenance Engineering Group. The number and completion status of maintenance activities performed and overdue are available from this source on a monthly basis.

- * Repairs, modifications and inspections/tests are being documented for maintenance history in the recently adopted Job Control System.

- * Historical data on the performance and repair requirements for specific equipment were not available in the maintenance offices.

CONCERN: See Concern MA.4-1.

D. TRAINING AND CERTIFICATION

Previous TSAs of other 200 Area facilities identified weaknesses in training programs that were also applicable to training for the Tank Farm personnel. In most cases, initiatives to address these weaknesses are under way, although, generally not complete. In many instances the documentation is in place (particularly top-level policies and procedures) describing a comprehensive training system, but the system is often not yet operating in the manner described by the documents. Examples of this situation include: training program evaluation, Manager/Supervisor Certification, job-specific Maintenance personnel and Quality Control Inspector training, and updating of training materials.

Of particular concern to the Appraisal Team was the continuing practice of assigning personnel, who have not completed formal certification, to Tank Farm Shift Manager and Shift Support Supervisor positions. Applicable documents have been recently revised to delete a statement which allowed such personnel up to one year to complete certification following assignment to these positions. This statement has been replaced with one that requires Shift Manager and Shift Support Supervisor trainees to be directly supervised by a certified person. However, the Appraisal Team found several instances where that directive was not being followed.

WHC conducted a comprehensive assessment of 200 Area operator training programs during the summer of 1988. This assessment was comprehensive and provided 14 recommendations for improvement; seven near-term and seven long-term recommendations. All of these recommendations are being actively pursued, although none have been fully implemented. In general, the pace of training improvement is considered appropriate, and senior WHC management has provided appropriate support for training improvements. However, in several instances, simple, relatively low-cost actions that could result in immediate improvements in training are being deferred in favor of longer-term more labor-intensive efforts whose payoffs, while perhaps greater, are also a year or more away. Examples of activities with near-term impact include: training evaluations emphasizing on-the-job training (OJT), Technical Training Support for OSR drills, and Technical Training inputs for monthly safety meetings. There have also been frequent changes in the management and supervision of Tank Farm training efforts during the past 18 months which have caused changes in the direction and priority of this training.

TC.1 ORGANIZATION AND ADMINISTRATION

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

FINDINGS:

- While increased management attention and resources have been provided for Tank Farm training and certification programs, and top level procedures have been established for a comprehensive training organization, these procedures have not yet been effectively implemented in the areas of training program evaluation and training records retention. They also do not address technical training programs for which the Technical Training Organization is not responsible.

- Management Requirements and Procedures, MRP 6.13 of WHC-CM-1-3 is the top level WHC document that establishes requirements for implementation and documentation of training for WHC personnel, including those assigned to the Tank Farm. This document addresses training for the following personnel and job functions: operators, maintenance crafts, radiation protection technologists, technical instructors, and for the radiological, criticality, and industrial safety job functions.

- WHC-CM-1-3, MRP 6.13 assigns the Technical Training Organization with responsibilities for assuring that training programs meet applicable Federal, State and company requirements; and for conducting instructor training, administering written examinations, conducting training evaluations, and maintaining training records.

- WHC-CM-1-3, MRP 6.13 assigns line management with the responsibilities for technical guidance in training development, conduct of on-the-job training (OJT), approval of training programs, and funding for training programs.

- Section 200 of WHC-CM-8-6 provides the Technical Training Organization's procedures for implementing WHC-CM-1-3, MRP 6.13 requirements, including administrative requirements for the analysis, development, implementation and evaluation of all technical training, including that provided for personnel assigned to the Tank Farm. This document describes a comprehensive training system for the conduct of all phases of training programs.

- Part 4 of each of the WHC-CM-8-6 procedures addressing technical training identifies the responsibilities and authorities of both Technical Training and line organization personnel with respect to each technical training area.

- o Four technical instructors, assigned to the Technical Training Organization, are dedicated to Tank Farm training, primarily for operators and operations managers. Other full-time trainers (not dedicated to the Tank Farm) are provided for maintenance and safety training. During the past 18 months there have been several changes in the management responsible for Tank Farm operator training. This has resulted in multiple changes in direction and priority of this training.

- o Part 5 of Section 202 of WHC-CM-8-6 requires that all training, which is the responsibility of Technical Training, be developed using the Instructional System Design model, which is intended to ensure that this training is based on assigned job requirements. This requirement has not yet been fully implemented, although past training has been developed based on less rigorous determinations of training needs.

- o Sections 204 and 209 of WHC-CM-8-6 describe WHC requirements for examination control and training records maintenance, respectively. Tank Farm certification/recertification examinations are well controlled in locked cabinets. However, not all Tank Farm operator examinations are in compliance with the examination control requirements of WHC-CM-8-6 with respect to producing varied examinations. Written examinations that have been developed within the last year have been improved to address weaknesses identified by TSAs for other 200 Area facilities. Written examinations for all operator certification areas are scheduled for upgrading by the end of 1989.

- o Section 620 of WHC-CM-8-7 provides procedures for the administration and conduct of training specific to the 200 Area, which includes the Tank Farm. This document defines the responsibilities of Waste Management Division Managers for Tank Farm training programs.

- * WHC-CM-1-3, Section MRP 6.4, paragraph 3.0 defines both "lifetime" and "non-permanent" training records.

- * Personnel who are filing training records are applying the definitions of "lifetime" training records to only include course completion forms, and test scores in this category.

- * Other training and examination material (such as lesson plans for training courses and examination questions), if included in training records at all, are considered non-permanent records.

- * Some training records, such as those for non-destructive examination personnel, are not included in the central training records system.

* Because lesson plans and examination questions are not retained as permanent records, WHC will be able to demonstrate only that people were trained/examined in a particular area, but will not have a record of what the training/testing included. This is of limited value.

* Technical training procedures do not identify whether other training-related documentation (such as training program evaluation reports and instructor evaluations) shall be retained, and if so, whether each type of document is a lifetime or nonpermanent record.

CONCERN: (TC.1-1) (H3/C2) Documentation of the content of personnel safety and certification/recertification training, and associated examinations, is not being maintained as a lifetime record.

FINDINGS:

* Informal training program evaluations, conducted by the Tank Farm Administrator, who is a staff member in the Tank Farm Administrative Support Organization, have provided valuable feedback to line managers on needed improvements in Tank Farm training programs.

* WHC-CM-8-6, Sections 207 and 208 establish requirements for training program evaluation of Technical Training programs. These procedures were promulgated in June 1988.

* Evaluations of Tank Farm training programs have not been conducted using the methods described in these procedures.

* The manager responsible for these training program evaluations indicated that they would be of limited value until job analyses were completed to provide objective criteria for evaluation. He also indicated that he was reluctant to shift resources from higher priority training analysis and development efforts.

CONCERN: (TC.1-2) (H2/C2) Technical training programs are not being evaluated as required by applicable WHC procedures.

FINDINGS:

* Line organizations are completely responsible for technical training programs which are not assigned to the Technical Training Organization. Among these programs are training for Radiation Protection Technologists, Engineers, Railroad Operation and Maintenance personnel, Criticality Safety, Emergency Preparedness, and Quality Assurance. These programs do not benefit from Technical Training activities such as instructor qualification,

training development standards, and training program evaluation. There is also uneven implementation of these training programs; indicating that the quality of these programs is related to the priority and resources provided by responsible line managers. Weaknesses were identified in training programs for Railroad Operations and Maintenance personnel, Engineers, and Quality Control Inspectors.

* WHC procedures and policies with respect to technical training only apply to those training programs that are the responsibility of the Technical Training Organization.

CONCERN: (TC.1-3) (H2/C2) There are no WHC top-level policies or procedures establishing requirements for technical training programs that are not the responsibility of the Technical Training Organization.

TC.2 REACTOR OPERATIONS

PERFORMANCE OBJECTIVE: The reactor operator and reactor supervisor training and certification programs should be based on Standard ANS 3.1-1980 (Draft), as applicable, and should develop and improve the knowledge and skills necessary to perform assigned job functions.

This Performance Objective is not applicable to the Tank Farm.

TC.3 NUCLEAR FACILITY OPERATIONS OTHER THAN REACTORS

PERFORMANCE OBJECTIVE: The nuclear facility operator and supervisor training and certification programs should develop and improve the knowledge and skills necessary to perform assigned job functions.

FINDINGS:

- o Considerable management attention and resources have been focused on operator and operations management training within the past year, partly as a result of past TSAs of 200 Area facilities and partly in anticipation of accreditation of Tank Farm training programs. Comprehensive policies and procedures for operator training have been put in place. However, implementation of these procedures is not yet complete.

- o Beginning with the most recently hired Nuclear Process Operator (NPO) candidates, the Washington State Job Service has administered the Basic Occupational Literacy Test and the General Aptitude Test Battery. Collectively, these tests evaluate the ability of candidates to apply mathematics, chemistry and physics required by NPOs.

- o The Tank Farm operator training programs that are formally addressed by Technical Training are defined in Section 620 of WHC-CM-8-7. They include: operator new hire training, operator formal classroom training, operator on-the-job training, operator self-study training, operator certification and recertification, and operations supervisory/manager certification.

- o There are five levels of Tank Farm operations personnel: Operator Trainee, Nuclear Operator, Nuclear Process Operator, Shift Support Supervisor, and Shift Manager. The first three operations positions and their training requirements are defined in WHC-WD-56110-001. WHC-WD-56110-002 describes training requirements for 200 Area operations supervisors/managers, including Tank Farm Shift Managers and Shift Support Supervisors.

- o Tank Farm operator and supervisor/manager training is primarily implemented through self-study and on-the-job training under the cognizance of the Operations Organization. The Technical Training Organization has the lead responsibility for the development of training and examination materials (with review and approval by Operations) and administration of written examinations.

- o During the summer of 1988, WHC established a 200 Area Operator Training Task Force to evaluate the need for upgrades to these programs. In July 1988 this task force completed its report which included seven near-term and seven long-term recommendations. While none of the actions provided in these recommendations has yet been completed, they are all being actively pursued in an appropriate manner.

- o Initial training for Tank Farm operators and operations supervisors, as documented in WHC-WD-56110-001 and 002, includes: normal procedures, emergency actions, radiation control practices, functions of safety systems, procedures for making changes in operations, and OSRs.

- o The labor agreement between WHC and the Hanford Atomic Metal Trades Council requires that Tank Farm operators be certified in a minimum of two areas.

- o Interviews with several Tank Farm operators, each having over ten years of experience, indicated that the number of certification areas maintained by most operators had decreased, with many holding only the minimum number of certifications (two). There are a total of 14 different Tank Farm areas requiring certification. There are no monetary or seniority incentives for operators to maintain additional certifications. In the past, WHC management has had to reassign personnel or require personnel, who had met the minimum certification requirements, to obtain an additional certification to meet Tank Farm needs. Grievances have sometimes resulted, but needed personnel have been provided.

- * DOE 5480.5, Section 10, states that the purpose of training programs "is to assure that the nuclear facility is operated and maintained by personnel who are qualified to carry out their assigned responsibilities."

- * Until recently, 200 Area Shift Managers and Shift Support Supervisors were permitted up to one year following their assignment to complete certification. On October 3, 1988, WHC-WD-56110-002, was revised to require that 200 Area supervisor/manager trainees "work under the direct supervision of a certified manager."

- * During the appraisal, Appraisal Team members observed one shift for which neither the Shift Manager nor the Shift Support Supervisor was certified for the assigned positions. Another shift had a Shift Support Supervisor who was not certified, who had been assigned to the Tank Farms for less than one month, and who had no prior Tank Farm experience.

* It has been a routine practice to temporarily "upgrade" a certified Tank Farm operator to the Shift Support Supervisor position if either the regular Shift Manager or Shift Support Supervisor is unavailable, even though these operators are not certified for these positions. WHC-CM-1-3, Section MRP 4.34, paragraph 56.7.4 allows for this practice for up to twelve consecutive weeks.

CONCERN: (TC.3-1) (H1/C1)

Shift Manager and Shift Support Supervisor positions are routinely being staffed by personnel who are not formally certified.

FINDINGS:

* DOE 5480.5, Section 10, requires that "a program shall be established for the selection, training, and retraining of all individuals who operate, maintain, or supervise activities in nuclear facilities."

* Tank Farm operators and supervisors are provided refresher training in safety topics that are common to all WHC personnel, including: radiological protection, lock and tag control, hazardous material handling, and criticality safety.

* Recently, OSR drills have been conducted, by the Operations Organization, to walk-through procedures for abnormal/emergency actions. This program has the potential to be an excellent contributor to operator/supervisor continuing training. Shift members have regularly participated in emergency drills/exercises.

* A five-day 200 Area Facility Supervisor Improvement Training Program is scheduled to begin on April 17, 1989. Subsequent sessions are planned to include all current 200 Area supervisors including Tank Farm Shift Managers and Shift Support Supervisors.

* Additional operators and supervisors are being hired, with the goal of establishing a fifth shift by the end of 1990, to provide additional time for continuing training.

* Job-specific continuing training has been limited to safety meetings, self-study for recertification tests, and required reading of procedure modifications.

* There are no documented procedures for remedial training or removal of operators/supervisors from their duties if they fail recertification examinations.

CONCERN: (TC.3-2) (H2/C1)

There is no formal retraining program for Tank Farm operators or supervisors.

TC.4 PERSONNEL PROTECTION

PERFORMANCE OBJECTIVE: The personnel protection training programs should develop and improve the knowledge and skills necessary for facility personnel to perform their assigned job functions, while minimizing exposure of individuals to radiation and chemicals to as low as reasonably achievable.

FINDINGS:

- The Safety Training portion of the Technical Training Organization conducts New Employee Safety Orientation, which includes training in hazardous material and occupational and radiation safety. WHC-WD-561400-001 indicates that this training is required for all new employees, and that biennial refresher training is also required. This program was judged by the Appraisal Team to meet this Performance Objective.

- Much continuing training in personnel protection is provided through monthly safety meetings, which are conducted by line managers/supervisors. The requirements for the conduct and documentation of safety meetings are provided in Standard A-4 of WHC-CM-4-3. This standard provides no specific guidance/requirements concerning topics to be addressed in these safety meetings, or for how information is to be presented to ensure that workers learn the desired information.

- Appendices A through D of WHC-WD-56140-001 provide matrices for each safety course indicating which WHC employees require training, course completion requirements, supplemental training requirements, and retraining frequency.

- Satisfactory completion of personnel protection training is documented on a training completion form, which is entered into an automated training records information system by Training Administration and Program Development personnel.

- The automated training records information system is available to managers site-wide over a local area network. Managers are also provided monthly reports from this system showing training/certification status and required requalification dates for their employees.

- A comprehensive training and retraining program for Radiation Protection Technologists (RPTs) has been developed based on draft criteria for accreditation of DOE nuclear facility training programs.

- Appraisal Team members observed the conduct of one of the RPT retraining classes dealing with counting statistics. The class

included appropriate training materials and was adequately presented by a subject matter expert.

CONCERN: None.

TC.5 MAINTENANCE PERSONNEL

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

FINDINGS:

- o Significant improvements in Tank Farm maintenance personnel training programs have been implemented since consolidation. Most of these improvements have been with respect to general skills of the trade. Facility specific training is yet to be implemented.

- o There is a Central Maintenance Training Organization for WHC, which is part of Technical Training. While there are a total of eleven instructors in this organization, none of them are dedicated to Tank Farm maintenance training. Other than the Grout Treatment Facility, there has been no formal facility-specific training provided for Tank Farm maintenance crafts.

- o WHC-WD-56130-001, Rev. 0, of 10/01/88 provides implementation requirements for WHC maintenance training, including the Tank Farm.

- * Prior to consolidation, there had been no training provided to Tank Farm maintenance personnel related either to their craft or the facilities which they were assigned to maintain. This approach was justified on the basis that journeymen-level craftspersons were hired, and that knowledge of the effects of their work on facility operation was not needed by maintenance personnel.

- * Also prior to consolidation, maintenance personnel were permanently assigned to a particular facility, such as the 200 East Area Tank Farm or the 200 West Area Tank Farm. At present, 200 Area maintenance personnel are routinely reassigned among 200 Area facilities as maintenance needs change among these facilities.

- * "Implementation of Maintenance Training," WHC-WD-56130-001 of 10/01/88, provides a commitment to complete "essential equipment/systems" training for craftspersons by 10/01/89. This training, while planned, has not yet been conducted.

CONCERN: (TC.5-1) (H2/C2) Maintenance personnel have not received formal training in some equipment/systems specific to the Tank Farm.

TC.6 CRITICALITY SAFETY

PERFORMANCE OBJECTIVE: Personnel should receive training in nuclear criticality safety consistent with their assigned tasks.

FINDINGS:

- o Appendix 1A of Nuclear Criticality Safety, WHC-CM-4-29, categorizes the Tank Farm as a Limited Control Facility (facilities containing nuclear materials with more than a minimum critical mass, but which because their characteristics, cannot be critical).
- o This categorization is based on Criticality Safety Analysis Report 79-007, which was originally performed in 1977, and which has subsequently been revised on several occasions (most recently on 2/24/89).
- o Appendix 3A of WHC-CM-4-29 identifies criticality safety training requirements for personnel assigned to Limited Control Facilities, such as the Tank Farm. These requirements include attending the course "Criticality Safety Non-Fissile," upon initial assignment to the facility and once every two years thereafter.
- o Job-specific criticality safety training is the responsibility of line management.
- o A Criticality Safety Non-Fissile Training class was observed and found to be presented in a professional manner by a technically qualified instructor who is a member of the Criticality Engineering Analysis Organization.

CONCERN: None.

TC.7 TRAINING FACILITIES AND EQUIPMENT

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

FINDINGS:

- o Improvements in training facilities and equipment for 200 Area training, including the Tank Farm, have been realized in the past year, with additional improvements under development. However, mechanisms for identifying needed improvements based on equipment modifications or procedural changes have not yet been identified.

- o Conceptual design of a 15,000 square foot 200 Area training facility has been completed. The facility is scheduled for occupancy before the end of 1990.

- o The Maintenance Training Organization has a well-equipped training facility in the 100N Area, which includes classrooms and laboratory areas for all craft disciplines.

- * Section 211 of WHC-CM-8-6 defines the document revision process used to revise training materials, but it does not address how the need for revision based on modifications, procedures changes, etc. is determined.

- * The Tank Farm Technical Training Organization is not on distribution for Tank Farm operating or administrative procedures, nor does the Tank Farm Technical Training Organization maintain a technical reference library containing WHC and other manuals which apply to Tank Farm operations.

CONCERN: (TC.7-1) (H2/C2) There is no established mechanism for identifying needed changes in Tank Farm training materials based on equipment modifications or procedure changes.

TC.8 QUALITY CONTROL INSPECTOR AND NON-DESTRUCTIVE EXAMINATION TECHNICIAN

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.

FINDINGS:

- o The Quality Assurance Manual, WHC-CM-4-2 is based on ASME/NQA-1 (1986), including those sections which address quality assurance personnel training.

- o Sections QI 2.3, through QI 2.6 of WHC-CM-4-2 describe the indoctrination and training requirements for Quality Assurance (QA) personnel, including: QA inspection and test personnel, QA audit personnel, and NDE Technicians. These procedures address initial training and certification, maintenance of proficiency/recertification, training records retention, and the responsibilities for implementing these items.

- o WHC has a certification program for NDE Technicians that meets the requirements of the American Society of Non-Destructive Testing.

- o At least one NDE Technician is certified to Level III for each NDE area. Most other NDE Technicians are certified to Level II by examination by the certified Level III Technician.

- o One NDE Technician, certified at Level III for all NDE areas is retiring. His duties are being divided among three individuals, including the temporary reassignment of one individual, who is certified to Level III, from the QA Certification Organization.

- * All Tank Farm specific training for QC Inspectors is currently either self-study or on-the-job training (OJT). These self-study and OJT training requirements are documented on checklists that are approved by the responsible manager. However, the QA Training and Program Integration Organization has had no involvement in either the development or approval of these checklists.

- * The Tank Farm QC Inspector OJT checklists do not provide sufficient detail to ensure that consistent training is provided or that minimum standards are achieved. For example, one sign-off on the checklist is for "Transfer Routes." The only guidance on the checklist is that 12 hours of time be spent on this activity. No information is provided to guide either the trainee or the OJT instructor on what activities should be learned, or on how they are to be taught/evaluated.

* The only continuing training provided for QC Inspectors related to Tank Farm specifics is self-study of revised procedures or information presented in monthly safety meetings.

* Appendix C of the WHC "QA Training Plan," dated October 31, 1988, indicates that there are Tank Farm specific training courses in areas including transfer routes and jumper changes. However, no work has yet begun to develop these training courses. Responsible managers indicated that consideration is being given to using Nuclear Process Operator training materials for Tank Farm QC Inspector training. This Training Plan doesn't address continuing training.

* While Tank Farm QC Inspector personnel turnover has been low for the last several years, two of the five personnel in these positions were transferred to other positions during this appraisal, creating a need for initial training for new personnel.

CONCERN: (TC.8-1) (H2/C2) Quality Control Inspector initial and continuing training do not support job needs with respect to Tank Farm specific training.

E. AUXILIARY SYSTEMS

The auxiliary systems review was involved with ventilation systems, heat removal systems, vital power systems and fissile material and hazardous waste handling and storage. These Tank Farm systems were found to generally meet the Performance Objectives for Auxiliary Systems.

Procedures and limits are adequate for controlling radioactive and hazardous waste. The radioactive content of facility effluent is below the Administrative Control Values and the requirements of the Environmental Protection Agency and DOE. However, facility goals and objectives based upon past results and anticipated operations have not been established.

A program is underway in the 200 Areas to bring the design of all airborne effluent monitoring stations into compliance with current industrial standards and DOE requirements. However, there are a number of monitoring stations in the Tank Farm that are not in compliance.

A preventative maintenance program to routinely test vital equipment is in place and functioning, however, the equipment test procedures reviewed are not in compliance with current DOE orders and industrial standards. For example, emergency electrical power systems are not tested in accordance with DOE 5480.4 and IEEE 308-1980 and the procedure for testing High-Efficiency Particulate Air (HEPA) filters is not in compliance with ANSI-N510-1980.

The need to improve the quality of the test procedures has been recognized and, in some instances, programs to revise the procedures have been implemented. A more comprehensive programmatic approach is needed.

Vital electrical and ventilation systems are provided with backup capabilities. There is a need to more clearly define and control the designation of those systems and equipment vital to safe operation of the Tank Farm. The accuracy of current information in this regard is suspect.

Written plans and schedules to bring administrative systems and plant hardware systems into compliance with stated company policies and programs were not in evidence. For example, there is no written plan and schedule for the preparation of the Tank Farm Waste Minimization Program or for bringing the Computer Automated Surveillance System into compliance with the configuration control requirements of the Standard Engineering Practices manual.

Waste containing fissile material is controlled, stored and transferred within the Tank Farm in accordance with approved procedures.

AX.1 EFFLUENT HOLDUP AND TREATMENT

PERFORMANCE OBJECTIVE: Effluent holdup and treatment should ensure that the amount of hazardous substances released to the environment meets DOE and EPA standards.

FINDINGS:

- The amounts of hazardous substances released to the environment are well within the standards established by DOE and the Environmental Protection Agency (EPA). However, some systems related to effluent monitoring are not under configuration control and facility specific hazardous waste minimization plans do not exist for the Tank Farm and the Laundry. (See Concern AX.2-2)

- Liquid and gaseous effluent data were reviewed for the release of radioactive material. The effluent streams meet the EPA guidelines and comply with DOE 5480.11 (December 1988). Auditable records are maintained.

- Operating procedures exist and are employed.

- The gaseous effluent from a total of 29 Tank Farm Exhaust Stacks is sampled continuously during operation and analyzed weekly. The data is evaluated for trends.

- ALARA goals have been established in the form of Administrative Control Values. Discharges within these limits also prevent any offsite dose from exceeding Federal, State and local authority limits and prevent concentrations of radioactive materials in surface water and ground water off the Hanford site from exceeding established limits. (See Concern AX.2-2)

- Leak detection systems and effluent stream monitoring systems provide adequate operating information and sufficient warning of abnormal conditions. The leak detection systems data are accumulated, plotted, and evaluated for trends. (See Concern TS.6-1)

- Those systems monitoring effluent radioactivity were observed to be operating properly. The background radiation levels were found to be a factor of eight to ten below the systems alarm setpoint. Auditable records of readings are maintained.

- Some of the systems monitoring effluent radioactivity in the 241 A, AX and AY Tank Farm Areas are housed in metal cabinets that do not provide adequate protection from the weather. (See Concern MA.2-1)

- o The Computer Automated Surveillance System Configuration Control Committee will not permit changes to CASS software until the current project to establish the baseline software configuration is completed.

- * CASS is used to alert operators to abnormal conditions in the Tank Farm, some of which are normally unoccupied. The system provides real-time alarm monitoring, reporting, and data storage of alarms, effluent radioactivity, liquid levels, temperatures and dry well logs.

- * There is no written plan and schedule to place CASS under configuration control, document the system architecture, and develop a system software specification.

CONCERN: (AX.1-1) (H2/C2)

The Computer Automated Surveillance System used in control and monitoring of Tank Farm operations is not under configuration control in accordance with Standard Engineering Practices, WHC-CM-6-1, Procedure EP 2.1, "Configuration Control".

FINDINGS:

- o The results of record sample analyses form the basis for reporting to DOE the amount and concentration of airborne radioactive contaminates released to the environment.

- o The technician responsible for compiling the liquid effluent portions of the reports prepared by the 200/600 Environmental Protection Section recently left the organization and a backup or replacement technician has not been assigned. (See Concern AX.2-1)

- * Technicians in the 200/600 Environmental Protection Section use undocumented methods to perform data manipulation and management of record sample data.

- * The 200/600 Environmental Protection Section does not have written procedures for management and manipulation of record sample data.

- * The 200/600 Environmental Protection Section does not have written procedures for preparation of "WHC Effluent Release and Solid Waste Management Report for 1988: 200/600 Areas," WHC-EP-014-1.

- * The 200/600 Environmental Protection Section does not have a formal program or written procedures to compare radioactive discharges to the environment from year to year, and to evaluate data for trends. These comparisons are now being made on an informal basis.

CONCERN: (AX.1-2) (H3/C2)

Within the 200/600 Environmental Protection Section, there is a lack of administrative and management control over the process by which the amount of radioactive material released to the environment is calculated and reported to DOE.

FINDINGS:

* Goals based upon past results and anticipated Tank Farm operations have not been set for the release of hazardous substances to the environment.

CONCERN: (AX.1-3) (H3/C2)

Goals for the Tank Farm, based upon past results and anticipated operations, have not been established to reduce the total quantities of hazardous substances discharged to the environment.

AX.2 SOLID WASTE

PERFORMANCE OBJECTIVE: Solid hazardous waste should be controlled and handled to minimize the volume generated, and provide for safe storage and transportation.

FINDINGS:

- o Solid hazardous wastes are controlled and safe storage is provided. A written Tank Farm "Waste Minimization Plan" has not been prepared. Some routine hazardous materials surveillances are not being performed.
- o Procedures for the handling, storage, classification, and transportation of hazardous waste exist and are used by the Tank Farm personnel.
- o All Tank Farm staff members participate in training in hazardous solid waste handling procedures. Personnel from operations, maintenance and engineering who have routine contact with hazardous material receive additional training. Waste minimization is emphasized in the training courses.
- o Procedures for using, cleaning and reusing protective clothing are in place.
- o Tank Farm hazardous waste is collected from the Tank Farm and stored in the Non-Radioactive Dangerous Waste Storage Facility, Bldg. 616, prior to shipment to offsite disposal facilities.
- o Hazardous waste accumulation stations are established near generation sites.
- o Hazardous materials stored at accumulation stations for shipment to Bldg. 616 are required to be inspected weekly.
- o A significant number of people have recently left the organization or have been transferred to new job functions.
- * A 55 gallon drum labelled "waste oil" was stored on the concrete pad at the 272-AW accumulation station. The drum was severely dented. There is no secondary containment for the drum.
- * Two 55 gallon drums labelled "waste oil" were stored on the gravel at Bldg. 271-AW. The drums were severely dented. There is no secondary containment for the drums.
- * The Tank Farm Maintenance Organization does not have a person designated as an "authorized shipper" and qualified in accordance with Hazardous Materials Packaging and Shipping, WHC-CM-2-14.

* The hazardous material storage drums in use at the Bldg. 272-AW accumulation station have not been inspected since January 1989. The staff member qualified and assigned the task of performing the inspections left the Tank Farm Maintenance Organization in January 1989.

CONCERN: (AX.2-1) (H2/C2) Management and supervision are not ensuring that duties prescribed by procedures and regulations are being accomplished when key personnel are lost from the organization.

FINDINGS:

o Guidance for writing facility specific waste minimization plans has been provided in procedure SD-WM-EV-014, Rev. 0, "Guide for Writing Facility Specific Waste Minimization Plans."

o All waste generated in a radiation area, whether contaminated or not, is treated as low-level radioactive waste. As an example, Bldg. 224T has a posted radiation area encompassing the waste receiving area, X-ray facility, assay facility and the waste interim storage facility. All trash generated within the radiation area is placed in boxes which are designated for low-level radioactive waste. A radiation survey of the trash is not performed prior to placing the trash in the box. The boxes are then disposed of as low-level waste.

* WHC has established a Waste Minimization Policy and Program which complies with DOE 5820.2A and DOE 5480.1B. The policy and program have not been implemented at the Tank Farm and the Laundry.

CONCERN: (AX.2-2) (H3/C1) Facility-specific hazardous waste minimization plans and annual and goals have not been established for the Tank Farm and the Laundry, as required by DOE 5820.2A and DOE 5480.1B.

AX.3 STORAGE AND HANDLING OF FISSILE MATERIAL

PERFORMANCE OBJECTIVE: Fissile material should be stored and handled in a manner which minimizes the chance of loss, contamination, release or inadvertent criticality.

FINDINGS:

- Radioactive wastes which contain fissile material are controlled, stored and handled in a manner which precludes inadvertent criticality or releases of fissile material.
- Nuclear Criticality Safety, WHC-CM-4-29, Appendix 1A, categorizes the Tank Farm as Limited Control Facilities (facilities containing fissile materials with more than a minimum critical mass, but which because of its characteristics cannot be critical).
- This categorization is based on Criticality Safety Analysis Report 79-007. Criticality Safety Analysis Reports have been completed for the Tank Farm and a summary has been incorporated into the appropriate SAR.
- Tank Farm operations and maintenance personnel receive formal classroom training and on-the-job training in the handling and storage of fissile wastes in accordance with Appendix 3A of Nuclear Criticality Safety, WHC-CM-4-29.
- Tank Farm operating procedures prescribe fissile material limits for the transfer of liquid fissile wastes into the Tank Farm or between tanks within the facility.
- The Tank Farm does not contain or receive unirradiated fissile material.

CONCERN: None.

AX.4 VENTILATION SYSTEMS

PERFORMANCE OBJECTIVE: Ventilation systems should reliably direct all airborne effluent from contaminated zones or potentially contaminated zones through cleanup systems to ensure that effluent reaching the environment is below the maximum permissible concentrations.

FINDINGS:

- o The ventilation systems at the Tank Farm operate reliably and direct airborne effluent from contaminated zones through High-Efficiency Particulate Air (HEPA) filters prior to discharge to the environment. However, the design of some effluent sampling systems, the testing of HEPA filters, and the airflow pattern within the Laundry are inadequate.

- o The air flow in the Laundry is from the radiation/potentially contaminated area to the clean areas. WHC is aware of the condition, and a contract award to rectify the condition is imminent. The corrective action will be completed in fiscal year 1989.

- o On-the-job training is used for all training of Air Balance Power Operators.

- o Job control packages are not being supplied to the Vent and Balance Group.

- o Job priorities are not being established for the Vent and Balance Group.

- o The Job Control System has not been implemented in the Vent and Balance Group.

- * Only five of the eight publications, which are referenced in Procedure 7-GN-46 and are used in on-the-job training, could be found in the Vent and Balance Group office. Training guides and related training material were not available from the Vent and Balance Group.

- * The supervisor of the Vent and Balance Group has recognized the need for training materials and has requested assistance from the Training Group to develop training material.

- * Procedure 7-GN-46 invokes ANSI-N45.2.6 "Qualification of Inspection, Examination and Testing Personnel for Nuclear Power Plants;" as a basis for training Air Balance Power Operators. The standard is not included in the reference section of the procedure.

* ANSI-N45.2.6 was superceded by ANSI NQA-1 and ANSI NQA-2 in September 1986.

CONCERN: (AX.4-1) (H3/C2) On-the-job training of Air Balance Power Operators is not being accomplished in accordance with ANSI-N45.2.6 (superceded by ANSI NQA-1 and ANSI NQA-2).

FINDINGS:

- All gaseous effluent streams are monitored for radioactivity and volume. These data are evaluated for trends that would indicate leaks.
- Filter differential pressure is monitored to detect clogging of filters.
- HEPA filters are tested regularly in accordance with Plant and Facility Maintenance, Procedure 7-GN-46, Rev. 1, "In-Place Testing of HEPA Filter Systems."
- The acceptance criteria for the testing of HEPA filters is contained in the Environmental Control Manual, WHC-CM-7-5, and Procedure 7-GN-46, Rev. 1.
- The Environmental Control Manual, WHC-CM-7-5, is not referenced in Procedure 7-GN-46.
- Most ventilation systems have permanently installed backup fans. Tanks 105C and 106C and the SY Tank Farm Area have no installed backup fans. Additional ventilation system backup is provided by portable ventilation systems consisting of a 1000 CFM exhauster and inline HEPA filters.
- All air effluent monitoring equipment is tested and calibrated in accordance with ANSI-N13.1-1969, "Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities" and ANSI-N13.10-1974, "Specification and Performance of Onsite Instrumentation for Continuous Monitoring Radioactivity in Effluents". The calibration schedule is produced by the Process Instrumentation Surveillance, Calibration and Evaluation System.
- All air effluent monitoring equipment is currently selected in accordance with ANSI-N13.1-1969 and ANSI-N13.10-1974.
- WHC has implemented a program to bring all air effluent monitoring equipment into compliance. However, a completion date has not been established for the program.

* The current issue of the standard, ANSI-N510 "Testing of Nuclear Air-Cleaning Systems", is 1980. Procedure 7-GN-46 which was revised on September 12, 1988 references the outdated standard, ANSI-N510-1975.

* The testing method prescribed in Procedure 7-GN-46 does not follow the guidance of ANSI-N510-1980. For example, the standard specifies stable conditions as subsequent data sets having values within ±5 percent. Procedure 7-GN-46 requires stable conditions but does not define the condition. The penetrometer specified in the test has a threshold sensitivity which is a factor of 100 less than that specified in the standard. The alternate test method specified in the test procedure is not in compliance with the method specified in the standard.

* The air effluent monitoring equipment installed in the 241AN, K1 and K2 exhausters, and the four cabinets in 244BX, 244U, 244S and 244TX catch stations does not comply with the requirements of ANSI-N13.1-1969 and ANSI-N13.10-1974.

* Some air effluent monitoring systems do not meet the requirements of ANSI-N13.1-1969, ANSI-N13.10-1974, Radiological Design, WHC-CM-4-9 and Environmental Compliance, WHC-CM-7-5.

* Procedure 7-GN-46, Rev. 1, "In-Place Testing of HEPA Filter Systems," is not in compliance with DOE 5480.4 which adopts ANSI-N510-1980.

CONCERN: (AX.4-2) (H2/C1) The design and testing of ventilation systems does not meet the requirements of ANSI-N13.1-1969, ANSI-N-13.10-1974 and DOE 5480.4.

AX.5 VITAL SUPPLY POWER

PERFORMANCE OBJECTIVE: The electric, wastes and emergency power systems should reliably provide vital services needed by the facility.

FINDINGS:

- o Except as noted below, the electrical and emergency power systems provide reliable service and are tested in accordance with applicable standards.
- o The Tank Farm has five diesel generators which, in the event of a loss of the normal power source, provide backup power to Tank Farm systems necessary for operation.
- o The diesel generators are required to be load tested annually in accordance with Preventative Maintenance procedure 2E0745, "Operability/Load Test of Diesel Generators 244-AR, 241-A and 242-A."
- * Tank Farm emergency electrical power systems are not tested in accordance with IEEE 338-1977, Section 6 and IEEE 308-1980, Section 7.
- * Preventative Maintenance procedure 2E0745 does not meet the requirements of IEEE 338-1977, Section 6 and IEEE 308-1980, Section 7. The procedure does not prescribe time response testing, is not specific to each diesel generator, and does not provide specific acceptance criteria for each diesel generator. The format of the procedures is not in compliance with the standard.

CONCERN: (AX.5-1) (H2/C1) The Tank Farm emergency electrical power systems are not tested in accordance with DOE-5480.4, which invokes IEEE 338-1977, Section 6 and IEEE 308-1980, Section 7.

FINDINGS:

- o The 244-AR facility is currently not in service.
- * No written documentation cancelling the OSR related preventive maintenance associated with the 244-AR facility was in evidence.
- * The annual test of the diesel generators is designated an OSR in Preventative Maintenance procedure 2E0745, "Operability/Load Test of Diesel Generators 244-AR, 241-A and 242-A."
- * Three of the five generators were tested on August 31, 1988. The two diesel generators located at Bldg. 244-AR were not load-tested during 1988.

* The 244-AR Diesel Generator Number 2 had been physically removed from its normal location. Both existing 244-AR diesel generators had been disconnected from the electrical distribution system. A replacement diesel generator (500 KVA Caterpillar) had an inoperative fuel pump and, therefore, was not tested on August 31, 1988.

* The plant operations control records clearly indicate the 244-AR diesels load-test is an OSR that had not been completed.

* The preventive maintenance job card was prepared and signed by craftpersons and management, indicating the load test had been completed.

* Tests of vital equipment have not been performed as required. As of the date of this appraisal the condition has gone uncorrected for a period of seven months.

CONCERN: (AX.5-2) (H3/C2)

Tests of vital equipment have not been performed in accordance with the OSR designated Preventative Maintenance procedure 2E0745, "Operatibility/Load Test of Diesel Generators 244-AR, 241-A and 242-A."

AX.6 HEAT REMOVAL SYSTEMS

PERFORMANCE OBJECTIVE: The heat removal system should reliably remove heat as required from the reactor or process.

FINDINGS:

- o Process heat is reliably removed from the Tank Farm.
- o The Tank Farm does not have recirculating cooling systems. Where cooling is required, once-through systems are used.
- o Tank Farm operators are trained in the use of normal and emergency procedures. Both formal and on-the-job training are documented and auditable records are maintained.
- o Instruments monitoring the aging waste tank, evaporator and condenser coolant discharge temperature and radioactivity are maintained. The temperatures of the discharges to the environment are acceptable.
- o The cooling water tower is a backup system and is maintained in a dry condition, and, therefore, does not require chemical treatment.
- o Procedures and system are available to minimize the release of radioactive material in the event of leakage from the evaporator to the condenser.

CONCERN: None.

AX.7 ENGINEERED SAFETY SYSTEMS

PERFORMANCE OBJECTIVE: Engineered safety systems shall be reliable and available to provide protection to the facility when needed.

The Tank Farm does not contain systems or components that have been designated as engineered safety systems. Therefore, this Performance Objective is not applicable.

AX.8 COOLANT CLEANUP SYSTEMS

PERFORMANCE OBJECTIVE: Recirculating coolants should be cleaned continuously or intermittently to minimize the build up of contamination and reduce corrosion.

The Tank Farm does not contain recirculating coolant systems and therefore this Performance Objective is not applicable.

F. EMERGENCY READINESS

The capability of WHC to respond to emergencies at the Tank Farm is generally good. More complete implementation of the emergency preparedness training program, more universal availability of emergency kits to first response emergency personnel, and regularly scheduled integrated exercises can help strengthen this program.

The Shift Manager, Tank Farm operators and support personnel (e.g., Radiation Protection Technologists) will most likely be the first on the scene of an accident or developing emergency. Other site-wide organizations, such as the Hanford Fire Department, Hanford Patrol, and Emergency Medical Technicians can be expected to respond quickly. The establishment of a command post under the leadership of the Building Emergency Director followed by the activation of the Emergency Control Center and Emergency Management Center by a trained cadre will be the first steps in mitigating the situation.

The Appraisal Team judges that this framework for emergency response, as described in the WHC "Site Emergency Plan" and implemented by sub-tier Tank Farm emergency plans, provides a strong capability for dealing with all anticipated situations, although this was not demonstrated for non-radiological material incidents. The emergency plans themselves were of good quality, but out of date. Personnel notification lists and a document control system which does not provide positive assurances that controlled copies of the plan are current, detract from the value of these plans.

There are many positive aspects to the emergency response training program. The professional staff in the Emergency Preparedness Organization are very competent. Lesson plans and course material developed by these individuals appear to be of high quality. The complete implementation of this training for all personnel likely to have emergency response functions (e.g., Building Emergency Director and emergency bus drivers for evacuation) remains to be accomplished. The Emergency Preparedness Staff has the capability for organizing complex integrated emergency exercises, however, until this appraisal, such an exercise had not been performed at the Tank Farm.

The critique held after the exercise identified a number of areas where improvements in the emergency response capability can be, and are being made. This strengthening of an already good program points out the advantages of regular integrated exercises.

Generally speaking, the facilities, equipment and resources which support the Tank Farm are adequate to support facility emergency operations. More effective use can be made of emergency kits by personnel initially responding to an emergency.

ER.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Emergency preparedness organization and administration should ensure effective planning for, and implementation and control of, facility emergency response.

FINDINGS:

- o Resources, in terms of manpower and equipment, are generally sufficient to accomplish assigned tasks for routine and emergency duties. Emergency response personnel training has not been implemented completely.

- o Emergency Plan, WHC-CM-4-1, Rev. 2, November 28, 1988, describes the structure of the Emergency Response Organization including the interface with DOE-RL. This plan is implemented by subtier documents for the Tank Farm. These implementing documents are the "Building Emergency Plan for East Tank Farms", WHC-IP-0263-ETF, September 23, 1988, and "Building Emergency Plan for West Tank Farms and Burial Grounds", WHC-IP-0263-WTF, September 23, 1988.

- o Emergency Management Procedures, WHC-CM-4-43, Rev. 6, January 20, 1989, includes direction for the operation of the 200 Area Emergency Control Center (ECC).

- o The responsibilities and authorities of personnel in the Emergency Response Organizations are defined in the WHC" Site Emergency Plan," the emergency procedures, and in the building emergency plans.

- o Facility personnel are responsible for taking initial emergency actions. Some facility personnel having emergency response duties have not received training for these duties. (See Concern ER.3-4)

- o Within the 200 Area, and throughout the Hanford reservation, are many resources (e.g. dosimeters, radiation protection technicians, radiation detectors, etc.) which could be drawn upon in an emergency.

- o The Emergency Preparedness Organization prepares weekly "On Call" lists designating personnel having emergency response functions.

- o The building emergency plans contain out-of-date lists of primary and alternate personnel to be contacted for emergencies in the various Tank Farm facilities. The "On Call" list has to be consulted for home telephone numbers. (See Concern ER.2-1)

- o The emergency cadre in the ECC demonstrated a clear understanding of their responsibilities during an emergency exercise conducted during this appraisal.

- o Technical support personnel designated to perform hazardous exposure assessments and to address Tank Farm systems issues are available to the emergency cadre.

- * The emergency preparedness/emergency response capabilities of the industrial hygiene program have not been demonstrated in the Tank Farm. Previous WHC exercises at other site locations (i.e., code names "Elliott" and "Caesar") indicated some deficiencies and reassignment of emergency support response duties. Non-radiological emergency response is not included in routine drills/training for Tank Farm personnel.

- * Non-radiological emergency response is a major element in personnel protection in Tank Farm areas:

  - An incident in 1987 involved acute effects of a non-radiological hazardous material (ammonia fumes) resulting in two lost workday cases,
  - It is not feasible to have a major radiological release without at least some non-radiological material considerations,
  - Non-radiological chemical contents of tanks are frequently not characterized,
  - Performance capabilities in non-radiological emergency preparedness, are receiving emphasis by DOE, the public, media, and Federal/State agencies,
  - Non-radiological emergency response requires extensive support from non-Tank Farm fire department personnel that must be mobilized,
  - Personal protective equipment available for selected non-radiological materials may require supplementation with equipment from remote locations, and
  - DOE 5500.1A, DOE 5500.2A, and DOE 5500.3 require non-radiological emergency response capability.

CONCERN: (ER.1-1) (H2/C1) The WHC emergency response capabilities for non-radiological material incidents in the Tank Farm areas have not been adequately planned or demonstrated, as required by DOE Orders.

ER.2 FACILITY EMERGENCY PLAN

PERFORMANCE OBJECTIVE: The emergency plan and its supporting documents should provide for effective response to abnormal conditions.

FINDINGS:

- o The "Site Emergency Plan" and its supporting documents provide effective response to abnormal conditions; however, the personnel notification lists in the Tank Farm emergency plans contain out-of-date and incomplete information.
- o The Emergency Plan, WHC-CM-4-1, and the Emergency Management Procedures, WHC-CM-4-43 are controlled Westinghouse documents.
- o The Tank Farm emergency plans were located in all of the Tank Farm Control Rooms and shift offices visited.
- o The SARs are used to determine the safety "envelope" which is factored into the development of facility specific emergency plans. Although the SARs are not consistent with DOE format requirements and have not used modern risk assessment techniques, WHC management indicated that the technical analyses still provide a valid basis for the emergency plans.
- o Both the site and Tank Farm emergency plans are consistent with the requirements of DOE 5500.2 and DOE 5500.3.
- o The Tank Farm emergency plans which are used as subtier implementation documents, contain information of a general nature in the front of the document. Facility specific information is contained in appendices at the back of the document. Tabbed sections facilitate access to the information in the plans.
- * The notification lists in the Tank Farm emergency plans contain only work telephone numbers. Home telephone numbers must be obtained from a separate "On Call" list.
- * A Shift Support Manager spent several minutes consulting the "On Call" lists and the building emergency plans to obtain telephone numbers when interviewed by Appraisal Team members.
- * The names of individuals assigned to various areas of responsibility in the Tank Farm emergency plans were found not to be current.

CONCERN: (ER.2-1) (H2/C2) The personnel notification lists in the Tank Farm emergency plans are not current and do not contain alternate means of contacting key emergency personnel.

FINDINGS:

- o The "Site Emergency Plan" is a controlled document. Updated pages are distributed through the mail. The pages are to be replaced in the manual and the document custodian is to initial an update page inside the cover.

- * In the alternate 200 Area Emergency Control Center (ECC), located at Rattlesnake Mountain, one member of the WHC Emergency Preparedness (EP) Organization indicated that a stack of loose pages located near the "Site Emergency Plan" might be update pages. Another member of the EP Staff was unable to readily determine if the "Site Emergency Plan" in the Rattlesnake Mountain ECC was up to date.

CONCERN: (ER.2-2) (H2/C2)
The document control system does not provide positive assurance that controlled copies of the "Site Emergency Plan" are current.

FINDINGS:

- o The building emergency plans contain a description of employee responsibilities for personnel accountability and evacuation.

- o The Tank Farm emergency plans indicate that the Building Emergency Director is responsible for allowing reentry into an evacuated area. Guidance on reentry is given in the "Site Emergency Plan."

- * The "Site Emergency Plan" indicates that, in the event of an evacuation, personnel should follow additional instructions from an area public address system. The outdoor areas at the Tank Farm are not covered by public address systems. This was indicated to be a problem by EP personnel.

CONCERN:
See Concern ER.4-1.

ER.3 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.

FINDINGS:

- The Emergency Training Program develops and maintains the knowledge and skills for emergency personnel. However, several key personnel were found to be untrained and regular integrated exercises have not been held at the Tank Farm.

- As described in Organizational Charts and Charter, WHC-CM-1-2, CH 3.5, Rev. 2, October 1, 1988, the Emergency Preparedness (EP) Organization has the responsibility for providing general employee training aids (such as alarm tapes, posters, etc.) and to provide lesson plans and support for various orientation training sessions.

- The scheduling of training for the Emergency Response Organization, the Emergency Duty Officer, Building Emergency Director (BED), bomb search volunteers, and the evacuation bus drivers is the responsibility of the EP Staff.

- Tank Farm emergency training for all personnel is the responsibility of the immediate manager and the BED. The BED is the main point of contact with the EP Staff for Tank Farm emergency plan training.

- Training records for individuals are computerized. The course name, date last trained, and the date next due for retraining are associated with each individual's name. Employees' immediate managers keep paper copies of the training records.

- The lesson plan for the BED training was examined and found to be well organized. Training materials included a "how to" section with checklists for developing building emergency plans and how to conduct facility drills. The BED training includes a test.

- The EP Staff stated that "drills" are limited in scope, usually involving just facility personnel. "Exercises" are larger in scope and involve the integrated participation of many organizations.

- Each of the following drills are conducted at the Tank Farm on an annual basis: fire, evacuation, take cover, bomb threat, contamination spread, and loss of utilities. The EP Staff works with Tank Farm supervisory personnel to plan these drills. Forms approved by the BED are used to record post-drill comments. As documented in WHC internal memos, improvements are initiated in plans, procedures, and equipment as a result of these drills.

- o The Tank Farm Manager has initiated a program for expanding the facility drills to include unplanned and abnormal OSR related events. Six such scenarios have been developed and "round table" discussions are held with facility employees. The Tank Farm management indicated that the OSR drill program will grow to include more scenarios and will eventually result in monthly walk-through and field drills.

- o An emergency exercise was held during the appraisal. In this exercise scenario an aging waste tank released radionuclides as a result of overpressurization. A contaminated, injured victim required emergency treatment. In addition to response by emergency teams in the field, the Emergency Control Center (ECC) was activated.

- o The EP personnel involved in the exercise planning activities exhibited a high degree of competence. Exercise goals, objectives, limitations, actions to be simulated, and an exercise timeline were developed and documented. Simulated plume data was generated using SAR data.

- * Controllers were used in strategic locations to add realism to this exercise. The controllers also served as exercise evaluators. In the ECC, one controller supplying plume dispersion data became an active exercise participant. While observing the exercise, the Appraisal Team noticed that some controllers were coaching exercise participants.

CONCERN: (ER.3-1) (H3/C2) Combining controller/evaluator and controller/participant responsibilities can obscure emergency response deficiencies during exercises.

FINDINGS:

- o The overall emergency response during the exercise (e.g. treating the victim, assessing the situation, and taking initial steps to mitigate the problem) was judged to be adequate by the Appraisal Team.

- o A critique was held with all participants immediately following the exercise. A more detailed critique among the evaluators from the EP and Tank Farm Operations Staff was also held and a number of areas needing improvement in conduct of future exercises and in the actual emergency preparedness were noted. Action items to implement these improvements are being developed by WHC.

- * An exercise that tests the integrated capability and a major portion of the basic elements of emergency preparedness specified in the "Site Emergency Plan" is called an integrated exercise. Tank Farm and EP Staff stated that this was the first time an

integrated exercise had been performed at the Tank Farm. One of the major improvements identified in the critique was a need for additional training.

CONCERN: (ER.3-2) (H2/C2) Integrated exercises involving the Tank Farm have not been conducted on a regular basis.

FINDINGS:

* Training records were examined for five randomly selected individuals identified in the "East Tank Farm Building Emergency Plan" as having evacuation bus driver responsibilities. The most recent training was documented as being given six years ago. One individual had retired since the issuance of the "East Tank Farm Building Emergency Plan" in September 1988 and one individual had no record of being trained.

* EP Staff are aware of the lack of trained evacuation bus drivers. Lesson plans were developed in December 1988 and a periodic on-the-job training program for evacuation bus drivers is scheduled for implementation in the near future.

CONCERN: (ER.3-3) (H2/C3) Emergency bus drivers for evacuation do not receive periodic training.

FINDINGS:

* Changes in personnel within the Tank Farm are not reflected in the building emergency plan's assignment of responsibilities. Some recently assigned personnel have not been trained. A notable example of key personnel who require training is the Tank Farm Operations Manager, who acts as alternate BED, but has not received BED training.

* During back shifts, the Shift Manager acts as the BED. On the April 6, 1989 graveyard shift neither the Shift Manager nor the Shift Support Supervisor had received training as the BED. Both of these individuals did demonstrate basic knowledge of the building emergency plan when interviewed by Appraisal Team members. (See Concern TC.3-1)

CONCERN: (ER.3-4) (H2/C2) Some key personnel have not received the necessary training prior to being assigned responsibility for emergency response functions.

ER.4 EMERGENCY FACILITIES, EQUIPMENT, AND RESOURCES

PERFORMANCE OBJECTIVE: Emergency facilities, equipment, and resources should adequately support facility emergency operations.

FINDINGS:

- o Emergency facilities, equipment, and resources generally support facility emergency operations. However, limitations on communications with operators and the lack of knowledge about emergency kits and their availability is of concern.
- o Facilities that support emergency readiness at the Tank Farm consist of the Shift Manager's office, the 200 Area Emergency Control Center (ECC), an alternate ECC at Rattlesnake Mountain at the southwest corner of the Hanford reservation, and the WHC Emergency Management Center (EMC) at Bldg. 1170 in Richland, about 30 miles from the 200 Area.
- o The Shift Manager's office is equipped with radios and telephones for facility communication during emergencies. Tank Farm emergency plans are located in the Shift Manager's office.
- o The Emergency Duty Officer acts as a communications link between the event scene command post and the ECC and assists the Building Emergency Director (BED) in obtaining necessary resources.
- o The 200 Area ECC and the alternate ECC are well equipped, modern facilities with excellent resources to support emergency readiness.
- * The Tank Farm does not have a public address system.
- * There is no "buddy system" rule (e.g., at least two persons present in the area) for operators working in the Tank Farm. Because operators may be in the area by themselves, WHC has taken steps to purchase radios for those operators working in the Tank Farm. Those radios are not yet available.

CONCERN: (ER.4-1) (H2/C3) Limitations on communication capabilities between Tank Farm operators and Shift Managers could greatly increase the consequences of an accident.

FINDINGS:

- o Sealed emergency kits containing high-range, self-reading pencil dosimeters, high-range gamma monitors, respirators, and anti-contamination clothing are located throughout the 200 Area. These kits are maintained by PNL for WHC.
- o One of the emergency kits located in the Radiation Protection Technologist (RPT) trailer near the Grout Dry Materials Facility

was inspected. It was sealed on December 27, 1988. All of the equipment was within its calibration date, however no calibration due date was located on the outside of the kit. It was learned that the kit was to be replaced on a 6-month frequency. The respirators and some of the pencil dosimeters would have been past their due dates at that time.

- o The RPTs having custodianship of the kit had never viewed the inside of an emergency kit prior to the inspection by the Appraisal Team. The Tank Farm Manager, who is the primary BED for the 200 Area, was not aware of the emergency kits or their location.

- * The Emergency Duty Officer's vehicle does not contain an emergency kit.

- * An emergency kit was not brought to the event scene of the emergency exercise conducted for the Appraisal Team.

- * One of the Shift Managers indicated that operators investigating instrumentation alarms in Tank Farm Control Rooms (which would generally be the first indicator of an accident) would be instructed to carry gamma-sensing detectors. These detectors are obtained from a pool of "normal use" instruments located in various facility control rooms. Respirators are available in the Tank Farm Control Rooms. There are no high-range gamma detectors readily available to Tank Farm operators in the event of an emergency.

CONCERN: (ER.4-2) (H2/C3) Emergency kits are not universally available and their location and contents are not known to the Tank Farm Operations personnel initially responding to an emergency.

ER.5 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.

FINDINGS:

- o The emergency assessment and notification procedures are generally adequate. However, notification lists in the Tank Farm emergency plans are incomplete and out of date.
- o Classification of emergency events at the Hanford site is discussed in Emergency Plan, WHC-CM-4-1, Section 4. It is consistent with DOE requirements.
- o The WHC Emergency Director has the responsibility for recommending an appropriate emergency classification to the DOE-RL Emergency Action Coordination Team.
- o The 200 Area Emergency Control Center (ECC) contained wall posters providing guidance for classifying emergencies.
- o In the emergency exercise conducted during the appraisal, the WHC Emergency Director consulted his technical support personnel and assigned an appropriate event classification.
- o Dose assessment is provided in the ECC by trained professionals. These individuals perform quick estimates using SAR data. As information is acquired from the emergency scene it can be fed into personal computers containing simple models for computing plume dispersion. Real time meteorological data can be read by the computer system.
- o An automated computer-based telephone notification system is in use at WHC. This system contains predetermined notification lists of persons who have primary and alternate emergency response duties. Upon initiation of the system by a member of the Emergency Preparedness (EP) Staff, the system will attempt to contact all persons on the notification list, deliver a digitally recorded message, and verify that the message was received by the correct person. A log is generated of those persons contacted. The system recorded message and initiation may occur from a remote location.
- o The automatic notification system was subjected to a performance test on the evening of April 3, 1989, at the request of the Appraisal Team. The system attempted to contact 58 persons representing 19 ECC functions. A total of 19 persons were verified as receiving the system message; nine ECC functions had the primary person respond; seven functions did not receive a response.

- o EP Staff indicated that in an actual emergency, manual notification would be initiated to contact persons who did not respond to the automatic notification.

- o The EP Staff contacted all non-responding persons on the notification list the next day. Many of the persons contacted indicated a need to instruct family members in responding to the automatic notification system. Some of the non-respondents had home telephone numbers different from those in the notification data base. The EP Staff updated the data base.

- o The automatic notification system appears to be potentially useful in reducing the time required to contact emergency response personnel, but is not exercised on a sufficiently frequent basis.

- * The Shift Managers are responsible for contacting and communicating with the initial responders to an emergency. Notification lists in the "Site Emergency Plan" are incomplete and out of date.

CONCERN: See Concern ER.2-1.

ER.6 PERSONNEL PROTECTION

PERFORMANCE OBJECTIVE: Personnel protection procedures should control and minimize personnel exposure to hazards during abnormalities, ensure that exposures are accurately determined and recorded, and ensure proper medical support.

FINDINGS:

- o Personnel protection procedures generally control and minimize personnel exposures during emergencies. However, the lack of readily available self-reading dosimeters and high-range gamma detectors is of concern.

- o Individual exposure limits for emergencies are documented per the requirement of DOE 5480.1 Chapter XI in Emergency Plan, WHC-CM-4-1, Section 9.0, October 14, 1988.

- o Arrangements for the handling and transporting of a radiologically contaminated injured person were observed during an exercise. A critique held after the exercise identified improvements in the contamination control aspects of the exercise. The Appraisal Team judged that the response will be adequate in an actual emergency.

- o Medical facilities outside the Tank Farm were not appraised. However, they are provided at the Kadlec Medical Center in Richland, with backup arrangements existing with hospitals in Pasco and Kennewick.

- * Personnel at the Tank Farm wear the standard Hanford five chip (Thermoluminescent Dosimeter) badge. Emergency, high-range, self-reading pencil dosimeters are available in emergency kits located throughout the 200 Area, however persons having initial emergency response duties were not aware of these kits. The Emergency Duty Officer vehicle does not contain an emergency kit.

CONCERN: See Concern ER.4-2.

G. TECHNICAL SUPPORT

Except for significant deficiencies in the shipment of hazardous materials, noted below, technical support for the Tank Farm was judged to contribute effectively to safe and effective operations.

The responsibilities and authorities of managers and engineers are clearly defined. All required technical disciplines are in place and are available, but must be drawn from a diverse group of organizations and management chains. Engineers are closely coupled to the operational groups, and are responsive to group needs. However, the level of experience of some of the engineering support personnel was found to be relatively low.

Technical support documentation was found to be outdated, but programs are underway to correct this. In most cases the problem involved format, and safety issues have not been compromised. Operational efficiency, however, is impacted by the outdated documentation.

Efforts to assure safety and quality have been noticeably improved in the past 18 months. The development of a "Quality Improvement Program" (QIP) has advanced the identification, tracking and resolution of potential problems, leading to overall performance improvements. However, the QIP indicates that many procedures and activities, that were to be completed by the end of the formal transition phase, are still outstanding. They are scheduled and tracked, but implementation should be expedited.

SARs are not in compliance with DOE Orders and some WHC manual requirements. Plans for upgrades to the SARs have been prepared. However, the upgrade program for the Tank Farm is too far in the future. Some activity is required to mitigate the consequences of having outdated SARs for the next five to seven years. On balance, WHC programs to upgrade SARs are progressing and accomplishing positive results. The programs do need to be accelerated and expanded to achieve their intended effect.

Performance testing and monitoring is conducted by technical support personnel, but requires formality and rigor. Performance evaluation and trending is performed, but is inadequately documented.

The Tank Farm does not ship hazardous materials offsite and most of the shipments remain within the 200 Area. A notable exception is the return of "empty" liquid waste tanks cars which go to the 100, 300 and 400 Areas. Review of the shipment of liquid waste by tank cars resulted in several findings, the sum impact of which gave rise to a Category II concern. Similarly, the movement of sodium hydroxide within the 200 Area yielded a Category II concern. Basic to these concerns is a lack of coordination among WHC organizations when it comes to packaging and transportation.

The release of radioactive and hazardous wastes to the environment is monitored and controlled in a satisfactory manner, and management is committed to a program to minimize the release of all such materials. The program, however, lacks goals and needs to be conducted in a more rigorous and integrated fashion.

Fissile material exists and is handled at the Tank Farm. It is controlled in an effective manner on the basis of form and distribution, and by detailed accounting procedures.

TS.1 FACILITY MODIFICATIONS

PERFORMANCE OBJECTIVE: Technical support services required by the facility to execute modifications should be carried out in accordance with sound engineering principles.

FINDINGS:

- Except for problems related to inexperienced cognizant engineers, facility modifications are performed well.
- Procedures to conduct and control the design process are adequately covered in Standard Engineering Practices, WHC-CM-6-1. Specific procedures are provided for design verification.
- Procedures for design verification are required by the Quality Assurance Manual, WHC-CM-4-2, QR 3.0 and Projects Department Management, WHC-CM-6-2, Section 7.6.
- Procedures include provisions for documenting and resolving reviewer comments, records retention, and signature approval processes.
- Responsibilities of cognizant engineers, including design verification and documentation responsibilities, are defined in Standard Engineering Practices, WHC-CM-6-1, EP 5.2.
- The recently activated Job Control System (JCS) is effective in coordinating and controlling the engineering process from inception of a design requirement to final testing and closeout.
- Applicable codes and standards from DOE 5480.4A, "Environmental Protection, Safety and Health Protection Standards" are listed in management procedures and are further implemented by specific technical manuals. Functional design requirements documents list specific code requirements for individual design tasks and compliance is verified in the design review process.
- Construction projects involving the contracted architectural and engineering firm are handled by the Tank Farm Projects Organization. Minor problems were noted in interfacing between the rigorous Tank Farm engineering methods and construction engineering methods.
- Technical support provided by the Waste Management Advanced Engineering Group addresses advanced planning for waste management and investigates high technology areas to develop new waste handling and disposal systems and equipment. The planning function for future waste disposal programs was found to be well organized and effective. Understaffing was noted in the Tank Farm Plant Engineering Group.

* Under the current system, cognizant engineers from the Tank Farm Plant Engineering Group are given a great deal of responsibility and decision making authority. In many cases, the individuals involved have limited experience in this role (two to three years). Since closer engineering oversight and monitoring is required, this has placed additional burdens on operating, maintenance and other engineering personnel.

* Maintenance personnel cited specific instances where the lack of experience on the part of cognizant engineers has required that maintenance personnel perform what they consider to be engineering functions.

* Additional problems in providing technical support come about because the equipment is old and requires a high level of maintenance and attention. Procedures are out of date and are in the process of being upgraded. The recent adoption of the new JCS requires additional manpower, since it is still in the break-in phase.

* The management of the Tank Farm Plant Engineering Organization expressed concern over the inexperience of the Tank Farm cognizant engineers resulting from the relatively high turnover rate and insufficient funding for training of cognizant engineers.

CONCERN: (TS.1-1) (H2/C3) Inexperienced cognizant engineers are not being trained or certified quickly enough to meet workload requirements.

TS.2 ORGANIZATION AND ADMINISTRATION

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

FINDINGS:

- The organizational structure providing technical support to Tank Farm Operations is clearly defined and administered, with minor exceptions related to the implementation of administrative control procedures.
- All technical specialties required for day-to-day technical support, as well as long-range support, are available and are effective. Support is provided by a diverse group of organizations, at a variety of locations and under an assortment of management chains. In some instances, interactions between Tank Farm Plant Engineering and Central Engineering are governed by ad hoc working relationships, rather than by a well-organized management structure. The relationship between the Tank Farm Plant Engineering and the Operating, Safety and QA Organizations is clearly identified.
- Technical support supervisory personnel are highly knowledgeable of facility operations, because of the extremely close working relationship between Tank Farm Plant Engineering and Tank Farm Operations.
- In some instances, the engineering function is an integral part of the operating organization (Single Shell Tanks). In other instances it is separated organizationally (Tank Farm Plant Engineering) but is extremely close-coupled to operations through the cognizant engineers. In other cases, it is completely separated (Central Engineering).
- The total technical support capability is excellent, with all disciplines represented. Engineering support personnel are not used as effectively as they might be, because of the diverse organizational structure.
- Several instances of understaffing were noted, particularly in the Single Shell Tank Organization, where a large backlog of work has accumulated.
- The Tank Farm Design Engineering Group is well staffed with experienced engineers and has a low turnover rate.
- Performance appraisals are being used constructively to identify and describe job responsibilities and authorities.

- o Safety and quality requirements are part of the performance appraisal system.

- * Many administrative controls and their implementing procedures are not yet complete. Completion is planned and assigned as part of the "Quality Improvement Program" (QIP). Procedures not yet issued are also identified as "to be issued" in the index to Tank Farm Surveillance & Operations Administration, WHC-CM-5-7 of April 1988.

- * Many of the activities and procedures noted in the QIP are important to safety but are not scheduled for completion until the period from 6/89 through 12/89. Some mitigating actions are in place to reduce the impact of the lack of safety-related procedures, but they are not formally described.

CONCERN: (TS.2-1) (H2/C3) Actions to complete some safety-related activities and procedures listed in the Tank Farm "Quality Improvement Program" are prioritized for routine completion but should be completed sooner.

TS.3 PROCEDURES AND DOCUMENTS

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

FINDINGS:

- Some lower-tier technical support procedures and documents are outdated, however satisfactory corrective programs are underway. Tank Farm SARs are not in compliance with DOE Orders.

- Technical support procedures and documents consist of operating procedures for the Tank Farm engineering manuals and specifications, engineering drawings and SARs. Procedures and documents are generally available and used to support safe facility operations. However, a number of procedures and safety documents were inadequate, obsolete, unavailable, or not in compliance with current WHC guidance and DOE Orders.

- Controlled manuals (Series WHC-CM-XX) are prepared, reviewed, approved and revised in a systematic manner in accordance with Management Requirements and Procedures, WHC-CM-1-3, MRP 2.16, and the Quality Assurance Manual, WHC-CM-4-2 QR 6.0.

- Control of lower-tier procedures (operations procedures, etc.) is the responsibility of the using Division/Department Manager and the Engineering Configuration Management Section of Central Engineering.

- Standard practices describing the engineering process as it pertains to design, design control and design verification have been upgraded and are about 95 percent complete. Remaining areas requiring upgrades have been identified and scheduled for upgrading. No safety-related issues were noted. The upgrade to these specifications is underway and is anticipated to be completed within two months.

- One of the main outputs of the Tank Farm Plant Engineering Organization is the operating procedures for the Tank Farm. These procedures are out of date and are being upgraded. An important step was taken to reduce the number from about 500 to about 340. Of these, about 140 have been corrected. The remaining 200 procedures are being upgraded at about one per week. Changes are primarily in format and no safety issues were noted.

- o Of the total complement of drawings which describe the Tank Farm, about 10 percent are identified as key facility drawings, which are rigorously controlled. The remaining drawings are retained but have no update requirements. Prior to use (such as fabrication), any outstanding Engineering Change Notices are incorporated.

- o The Tank Farm Organization has developed implementing procedures for document review and for "Procedure Departure Authorizations," WHC-CM-5-7, Sections 1.4 and 1.7. These are satisfactorily implemented.

- * Upgrades to SARs are being performed using a team approach employing personnel from Operations and Projects. This has the beneficial effect that it encourages ownership on the part of the user organizations, however, problems in acquiring this support because of operational priorities have impacted schedules.

- * There are at least 15 Tank Farm SARs dating from 7/77 through 4/88 which are not in compliance with DOE 5481.1B, "Safety Analysis and Review System" and DOE 5480.5, "Nuclear Facility Safety." In general, these documents lack appropriate facility descriptions and hazards evaluations.

- * Nuclear Facility Safety Analysis, WHC-CM-4-46, of 9/30/88 which prescribes the requirements for SARs, is not in compliance with DOE 5481.1B, "Safety Analysis and Review Systems" and DOE 5480.5, "Nuclear Facility Safety."

- * WHC has prepared and submitted SD-WM-WP-008, Rev. 0, "Defense Waste Management Division Safety Documentation Program Plan," dated 2/10/89, in a transmittal from R. D. Wojtasek to R. E. Gerton (DOE/RL). The plan addresses Tank Farm as well as other defense waste SARs.

- * The program plan indicates that updates are both time consuming and expensive and have been prioritized in accordance with the following criteria:

  - Active operations which are not covered by safety documentation,
  - New or near-term facility construction or major modifications,
  - On-going documentation upgrade efforts,
  - Upgrades for facility documentation lacking in currently required areas, and
  - Upgrading remaining documentation based on the oldest documentation first.

- * This plan indicates that some Tank Farm SARs will not be upgraded until 1996.

CONCERN: (TS.3-1) (H2/C1)

Tank Farm SARs do not comply with DOE 5481.1B "Safety Analysis and Review System" and DOE 5480.5 "Nuclear Facility Safety."

TS.4 EQUIPMENT PERFORMANCE TESTING AND MONITORING

PERFORMANCE OBJECTIVE: Equipment performance testing and monitoring conducted by technical support groups to assure operations are within safety parameters and limits should be effective.

FINDINGS:

- o A more formal testing and monitoring program is required to enhance equipment effectiveness.

- o Tank Farm parameter and stack emissions, as well as evaporator emissions, are monitored and trending is performed. Additional monitoring capability for tanks will be provided by a new computerized system to backup the existing Computer Automated Surveillance System.

- o Several new, or enhanced, programs are being put in place to monitor equipment performance from a maintenance standpoint. These include: vibration monitoring, thermal imaging and lubrication oil analysis.

- o Line personnel conduct an internal surveillance of Tank Farm operations in accordance with procedure TFPC 2.1 of Tank Farm Surveillance Operations Administration, WHC-CM-5-7. The procedure implements Operations - General Administration, WHC-CM-5-5, GA-2.7. Findings/deficiencies are reported and tracked by Tank Farm administration, but are not published externally. They are periodically reviewed by the Quality Control (QC) Organization.

- o QC executes an independent surveillance program in accordance with planning developed by the cognizant Quality Engineer. Findings/deficiencies are reported by Inspection/Surveillance Report and are tracked to closure in the Quality Safety Trending system (See QI 16.1, "Trending/Trend Analysis").

- o A typical QC surveillance witnessed for Procedure Change Authorization control in the 242A evaporator office was satisfactory. The QC surveillance checklist lacked detail. As a minimum, QC surveillance should be upgraded and an inquiring, pro-active attitude should be fostered by adding a requirement to each QC checklist to survey the area for conditions adverse to safety and/or quality.

- o A formal equipment performance testing, monitoring, trending and analysis program is not implemented for all aspects of the operations at the Tank Farm. However, the lack of a formal program is being addressed in the Tank Farm "Quality Improvement Program," 4.15, and is scheduled for completion by 8/1/89.

- Some ad hoc data collections and analyses are performed by individual maintenance and/or cognizant engineers based on perceived special needs.

- When maintenance history automated data processing systems are fully implemented, the data bases will report on performance trends. No schedule for initiation of performance analysis of the data base system exists.

CONCERN: None.

TS.5 EVALUATION OF OPERATING EXPERIENCES

PERFORMANCE OBJECTIVE: Industry and in-house operating experiences should be evaluated by technical support analysts and appropriate actions taken to improve facility safety and reliability.

FINDINGS:

- o Some operating experience is formally analyzed and reported, but more formal and rigorous documentation is required.
- o Central Engineering Quality Assurance circulates information on equipment problems encountered at other similar operations. In the event the Maintenance Organization determines that similar equipment is used at the Tank Farm, a coordinated replacement effort is undertaken.
- o Feedback from the newly initiated Job Control System will materially assist in applying in-house operating experience to improve safety and reliability.
- o A continuing evaluation and analysis of the operating status of the Tank Farm is performed by experienced personnel. This is enhanced by the close relationship between Operations and Engineering Groups.
- o Tank Farm management provides a monthly "Plant Performance Status Report" that is widely displayed and distributed. This report includes safety, quality, maintenance and operating performance indicators and trends. Goals are established and performance and trends are tracked. WHC site-wide trending/trend analysis is performed in accordance with QI 16.1, Rev. 1 of 2/3/89. Source data is obtained site-wide and is tracked, reported and trended.
- o Both Tank Farm and site-wide WHC programs are implemented to report on performance experience, although implementing procedures (desk instructions) for conducting the evaluations, analysis and trending are lacking.
- o Implementing procedures are planned and scheduled to be completed between 4/30/89 and 6/30/89, as evidenced in the Quality Improvement Program and by the responses to internal audits.
- o Quality Safety Trending (QST) reports that receive management support and attention include: the "Trend Analysis Report," the "Tracking Report," and the "Quarterly UOR Report" (to DOE), "Monthly Open/Delinquent Report," and weekly supplements thereto.

* Site-wide QST still does not provide for adequate inclusion of events and experience from related industry and other DOE locations (e.g. Unusual Occurrence Reports). Some of these data (such as Institute of Nuclear Power Operations data) are reviewed and analyzed at some levels in WHC, but not by Quality Data System management. These data are not integrated into QST. The Tank Farm management has not found "outside" data to be helpful in identifying/resolving Tank Farm problems.

* The trending/tracking reporting and analysis programs lack formality and rigorous documentation, because procedures employed by QST and Tank Farm analysis personnel are not formally documented, published and controlled. Some of these are scheduled for completion by 4/30/89.

* Tank Farm and site-wide quality assurance and safety organizations have not published the required implementing procedures for managing the performance evaluation reporting, trending and analysis systems.

CONCERN: See Concern OA.1-1.

TS.6 ENVIRONMENTAL IMPACT

PERFORMANCE OBJECTIVE: The impact on the environs from the operation of the facility should be minimized.

FINDINGS:

- o Environmental impacts are minimized, but a more formal program is required and some problems associated with monitoring equipment require resolution.

- o The Environmental Division provides environmental monitoring for the Tank Farm. The division is clearly chartered to serve in an independent overview capacity to assure compliance with release limits specified in Environmental Compliance, WHC-CM-7-5.

- o Tank Farm management has taken an active but informal role in minimizing the release of hazardous materials to the environment, as evidenced by both near-term, and long-range plans. Examples are: plans in place to reduce untreated liquid releases to zero, closed-loop systems, improved monitoring systems, studies of advanced waste disposal schemes, ammonia treatment to reduce releases, and recycling of water. In addition, Tank Farm management is taking a more active role to interact with other organizations (including West Valley, Idaho National Engineering Laboratory, Savannah River and nuclear operations in France and England) to acquire improved technology. Teams will be established within the next six months to accomplish these exchanges in technology. As noted in Concern AX.2-2, a formal plan with specific goals is required.

- o Comprehensive and auditable records of releases to the environment are maintained.

- * Tritium monitoring systems currently used on the aging waste tanks are not reliable.

- * Monitoring systems for tanks and stacks are in place and operational. Radiation monitoring systems on portable tank exhausters have been a continuing problem because of frequent failures and excessive maintenance requirements. The exhaust systems are old and maintenance problems result because of fan overheating, inlet vane icing, water ingestion and heater failures.

- * Problems were noted in getting a prompt response in carrying out repairs or upgrades to monitoring systems on portable exhausters. Environmental Compliance, WHC-CM-7-5 requires that radiation monitoring systems on the exhausters be repaired within three days. Instances were cited where repairs were not undertaken for several weeks.

* Compliance plans are prepared for non-compliant items to justify continuing operations and to address actions and schedules to return to compliance. If compliance is not accomplished per schedule, a compliance plan must be re-submitted. Some plans have been resubmitted up to four times.

CONCERN: (TS.6-1) (H3/C2) Radiation monitoring systems are not in compliance with the requirements established by Environmental Compliance, WHC-CM-7-5.

TS.7 PACKAGING AND TRANSPORTATION OF HAZARDOUS MATERIALS

PERFORMANCE OBJECTIVE: Performance of the packaging and transportation functions should assure conformance with existing standards and accepted practices as given in DOE 5480.3, and its references.

FINDINGS:

- o Except for major deficiencies in shipment of liquid waste and sodium hydroxide, Performance Objectives for Packaging and Transportation of Hazardous Materials are being met.

- o Training deficiencies of Hanford railroad personnel contribute to the following non-compliance. (See Concern TS.7-3)

  * Hazardous Material Packaging and Shipping, WHC-CM-2-14, establishes requirements for packaging and transportation of hazardous materials. This policy is implemented by procedures for specific operations.

  * Hazardous Material Packaging and Shipping, Part IV, Radioactive Material, WHC-CM-2-14, requires that packaging and transportation procedures reflect the requirements of the Safety Analysis Report for Packaging (SARP) "prior to use of the container."

  * There is no requirement that the onsite SARP receive periodic review.

  * Radioactive liquid waste is shipped to the Tank Farm via pipeline and railroad tank cars. In the last year, eight tank car shipments were received from the 300 Area, and nine shipments were received from other areas.

  * The procedure, "Transfer of RLW to Railroad Tank Cars," DAR 349-2-3B, applies to the shipment of radioactive liquid waste from the 300 Area to the Tank Farm. Although it is written on Rockwell letterhead, it was upgraded on 3-21-88, after consolidation, and is scheduled for revision (June 30, 1989).

  * When transferring liquid waste to the tank car, the operator must be in the Bldg. 340 Control Room to start the transfer pump. Then, the operator must "run" to the door of the loading facility (approximately 50 feet) to check for leaks. If leaks are spotted, the operator must return to the Control Room to turn the pumps off. The arrangement does not provide for immediate shut-down of the pump, if a leak is spotted.

  * During a tour of the Bldg. 340 Control Room, the Appraisal Team was informed that some indicator lights on the control panel are not working.

* The liquid waste storage tank electronic/digital tank level gauges in Bldg. 340 are not calibrated. A bubbler gauge for the same tanks is calibrated, but the graphic readout (0.5 inches of graph paper equals approximately 1150 gallons) precludes accurate tank readings. The inherent error in reading any of the gauges is unknown. Accordingly, the tank car cannot be "...filled under strict liquid level control (weight factor instrument and load out tank material balance)..." as required in SD-RE-SAP-013.

* DAR 340-2-3B does not contain all the requirements of the "Safety Analysis Report for Packaging, Railroad Liquid Waste Tank Cars (HCS-044-001-03)," SD-RE-SAP-013. Specifically, it does not require that the railcar be placarded or the rail crossings (across paved roads outside limited areas) be blockaded.

* Radioactive liquid waste was shipped by the 300 Area Waste Services Organization to the Tank Farm on 3/29/89. The total amount of material in the tank car included 13.63 grams of fissile materials. Shipments containing more than 6 curies of Pu239 must be designated as a Highway Route Controlled Quantity [see 49 CFR 172.203(d)(iii)]. However, the amount of Pu239/240 was not indicated on the Radioactive Shipping Record, (RSR) # 22779; WM 89-06. In addition, the RSR did not contain written instructions to the carrier (the Hanford Railroad) to assure patrol blockade of paved roads prior to crossing. Operating procedures were not in place to ensure SARP (SD-RE-SAP-013) blockading requirements were implemented as required per WHC-CM-2-14.

* The railcar tanks which carry the radioactive liquid waste are required to be inspected annually. WHC internal review has determined that the annual inspections are deficient because of a contaminated heel (sediment) which resides in the bottom of the tanks. WHC has been unable to visually inspect the entire inside of the tanks. The railcars did not receive preventive maintenance scheduled for 3/30/89. The railcars are presently operating under a waiver (preventive maintenance schedule extended to 6/30/89) issued by DOE-RL.

* Preventive maintenance of regulated rolling stock is conducted <u>outside</u> Bldg. 2706T where blowing dust may interfere with established cleanliness requirements.

* The SARP, "Railroad Liquid Waste Tank Cars", requires "all loaded waste tank car shipments that cross paved roads...be patrol blockaded." This means that an "empty" tank car being returned to 300 Area from Bldg. 204 AR does not require a road blockade. Because of the residual heel (approximately 10 grams of fissile material) in the tank car(s), however, it is not clear why the "empty" tank car should not require a road blockade, as well as other precautions meant only for the loaded tank car.

CONCERN: (TS.7-1) (H2/C1) CAT. II

The packaging and transportation of radioactive liquid waste from the 300 Area to the Tank Farm is not in compliance with RL 5480.1, Chap III, Hazardous Material Packaging and Shipping, WHC-CM-2-14, or the specific requirements of the Safety Analysis Report for Packaging, SD-RE-SAP-013. (See Performance Objective AX.3)

FINDINGS:

- o The Tank Farm receives sodium hydroxide at Bldg. 204 AR approximately two or three times each year. The material is delivered by a DOE/WHC truck (HO 68C 9021) which is equipped with a 1500 gallon tank.
- o The truck (HO 68C 9021) is assigned to the 200E Rigging Shop and receives proper maintenance.
- * The truck's 1500 gallon stainless steel tank has not received preventive maintenance or annual inspections (Department of Transportation Specification MC-312). Data plate information indicates that the tank was built in 1984.
- * Railroad cars and trucks which have hazardous materials cargo tanks mounted on them are maintained by three different organizations. The "rolling stock" is maintained by Fleet Maintenance in either the 1100 Area or the 200 Area, and their records make no reference to the tank. Waste Management Maintenace Engineering writes the preventive maintenance procedures for the tanks. Tank Farm Maintenance uses those procedures when performing the tank preventive maintenance. Neither Waste Management Maintenance Engineering nor Tank Farm Maintenance make any mention of the truck or the railroad car. Hence, we have a situation such as the above-mentioned sodium hydroxide tank which has not received annual inspections. An "all-inclusive" vehicle maintenance program may have avoided the oversight. (See Concern TS.7-2)
- * Not all drivers assigned to the 200E Rigging Shop have received Truck Driver Training (Course #20153) and Hazardous Materials Carrier Training (Course #20064). Some of the trained drivers received Truck Driver Training more than two years ago.
- * Some 200E Rigging Shop truck drivers have received offsite training. This training does not appear in their training records.
- * There is no secondary containment at the sodium hydroxide unloading station on the north side of Bldg 204-AR.

CONCERN: (TS.7-2) (H2/C1) CAT. II

The shipment of sodium hydroxide to 204 AR does not meet the safety requirements of RL 5480.1, Chap III, or Hazardous Materials Packaging and Shipping, WHC-CM-2-14.

FINDINGS

- o Training of Tank Farm "designated shippers" is conducted by the WHC Shipping and Receiving Department. This includes initial training and recurrent training every two years.

- * The supervisor of the Track Maintenance Section has not had any Federal Railroad Administration (FRA) related training. This item was also noted in the PUREX TSA report.

- * Questions used on the written examination for the railroad track inspectors are not selected from a bank of examination questions. The trainer received FRA-related training in 1982, but has not had any additional, or recurrent formal training. This item was noted in the PUREX TSA report.

- * Hanford railroad engineers, conductors, and switchmen are hired as trainees, and receive four to six weeks on-the-job training. Their training is conducted by crew members who sign checklists as items are completed. Written examinations are not used. There is no requirement that the instructors receive formal instructor training nor formal FRA-related training. There is no requirement that any training be recurrent. This item was also noted in the PUREX TSA report.

- * Personnel who repair railcar running gear have not had formal FRA-related training.

- * These training programs do not benefit from Technical Training activities such as: instructor qualification, training development, and training program evaluation.

- * Additional training-related findings were reported, above. (See Concern TS.7-2)

CONCERN: (TS.7-3) (H3/C1)

The WHC Packaging and Transportation Training Program does not meet all the requirements of DOE 5480.3; RL 5480.1, Chap. III; or Hazardous Materials Packaging and Shipping, WHC-CM-2-14.

TS.8 REACTOR ENGINEERING

PERFORMANCE OBJECTIVE (Reactors Only): Reactor engineering activities should ensure optimum nuclear reactor operation without compromising design, safety, or nuclear fuel limits.

This Performance Objective is not applicable to the Tank Farm.

TS.9 CRITICALITY SAFETY

PERFORMANCE OBJECTIVE: Specialized support for criticality safety issues should be fully integrated into the operation of the Tank Farm.

FINDINGS:

- o Criticality safety is satisfactorily addressed at the Tank Farm.
- o Fissile material exists at the Tank Farm and is controlled in an effective manner on the basis of form and distribution and by a rigorous accounting system.
- o The criticality safety representative is in the Tank Farm Operations Organization and is the focal point for criticality issues at the Tank Farm.
- o The cognizant engineer in the Tank Farm Plant Engineering Group maintains records on all storage tanks and transfers. As part of this, he performs accountability functions with regard to fissile material. The criticality safety representative determines location and characterization of fissile materials from these records.
- o Fissile material is contained in, and transported by tank cars (See Performance Objective TS-7). These activities are covered by the Safety Analysis Report for Packaging.
- o Criticality safety documentation at the Tank Farm consist of three criticality safety specifications and a criticality SAR. These were found to be complete and up to date.
- o All facilities at the Tank Farm are designated as Limited Control Facilities on the basis of the form and distribution of the contained fissile material.
- o All events involving fissile material are coordinated through the Criticality Safety Representative in accordance with the specifications and the operating procedures. When it is necessary to deviate from these standard methods a special analysis is performed by the Criticality Engineering and Analysis Organization and an addendum to the SAR is prepared. On this basis, the specifications and procedures are altered. The new procedures are approved by the Criticality Safety Representative prior to use in the field.

- Current quantities of fissile material at the Tank Farm do not present a criticality issue. Documentation and procedures are in place and are adequate to assure criticality safety.

Concern: None.

H. SECURITY/SAFETY INTERFACE

Security for the Tank Farm is provided by the routine area patrols and perimeter access controls implemented by the Hanford Patrol for the 200 Areas in which the Tank Farm is located. There is no evident need for specific Tank Farm security planning. Security personnel receive adequate basic safety training in radiation protection, criticality, hazardous materials, and the effects of bullet impact on equipment and piping. The "Site Emergency Plan" clearly and specifically defines the responsibilities of security, safety, and operations personnel for each class of emergency. The Tank Farm emergency procedures adequately cover Tank Farm emergency requirements.

SS.1 SAFETY OF IMPROVEMENTS

PERFORMANCE OBJECTIVE: Security/safeguards improvements should not create or increase hazards that would impede the safe, reliable operation or shutdown of the facility in normal, abnormal, or emergency situations.

FINDINGS:

- o Security/safeguards improvements do not create or increase hazards at the Tank Farm.
- o The only security fences, structures and access controls directly related to the Tank Farm facilities are those for the 200 Areas.
- o The planning and design of security improvements are subject to review and approval by operations and safety representatives on the Design Review Committee, as required by Management Policies, WHC-CM-1-1, MP-6.2; and Standard Engineering Practices, WHC-CM-6-1, EP-4.1.
- o Documentation of the Design Review Committee approvals is maintained by the Security Engineering Organization, as provided by the Projects Department Procedures, WHC-CM-6-12, P-05.
- o The Vice President for Safety, Quality Assurance, and Security provides a direct, managerial mechanism for resolving conflicting priorities between Safety and Security. Normally, agreement is accomplished in lower-level committees or by direct negotiation between lower-level managers.

CONCERN: None.

SS.2 COMPATIBILITY

PERFORMANCE OBJECTIVE: Security/safeguards improvements should use design criteria consistent with the facility equipment/structures being protected.

FINDINGS:

- o Design criteria and specifications for natural phenomena are common to all improvement projects, including security projects, at the site.
- o Designs are evaluated for conformance to design criteria and specifications. The formal requirements for independent review are adequate.

CONCERN: None.

SS.3 EMERGENCY ACCESS

PERFORMANCE OBJECTIVE: Authorized facility and safety support personnel should not be denied access or exit in an emergency.

FINDINGS:

- o There are no controlled entry/exit devices (e.g. turnstiles, card reader controlled doors) in the Tank Farm. Keys to door locks are provided by the Shift Manager and Building Emergency Director, as required.

- o The design of gates and doors on the Tank Farm allows unimpeded ingress and egress; however, negative building pressure makes the opening of some doors very difficult. (See Concern FP.1-1).

- o Emergency response vehicles and personnel are allowed unimpeded access to any area/facility where an emergency exists, as provided by the "Site Emergency Plan." Key operations, safety, and emergency response personnel have identifying codes on their badges allowing them access during emergencies.

- o The only constraint to evacuation for Tank Farm personnel is the 200 Area perimeter fence. In view of the large area and multiple gates, the Team accepts the operating assumption that orderly and controlled evacuation of the 200 Area will always be possible.

CONCERN: None.

SS.4 FACILITY PLANNING FOR SECURITY/SAFEGUARDS EMERGENCIES

PERFORMANCE OBJECTIVE: Safety authorities and responsibilities for all types of security/safeguards emergencies should be clearly defined and understood by all involved parties.

FINDINGS:

- The "Site Emergency Plan" clearly, logically, and specifically defines the functions and responsibilities of security, safety and operations personnel for each class of emergency. DOE-Contractor interaction is addressed and lines of communication for resolution of issues are defined.
- The "Site Emergency Plan" requires all operating personnel who have emergency duties to receive appropriate, specified training at specified intervals. Deficiencies in emergency response training of Tank Farm personnel were noted. (See Concern ER.3-4)
- Limited scope drills, involving Tank Farm personnel, are held in accordance with a site-wide schedule of drills developed in compliance with the "Site Emergency Plan." Integrated exercises involving all components of emergency response, including security personnel, are not being held on an annual basis. (See Concern ER.3-2)
- Specific planning for Tank Farm security emergencies is not being done. The Appraisal Team agrees that the security afforded by the 200 Area patrols and perimeter access controls is adequate for the Tank Farm.

CONCERN: None.

SS.5 SAFETY OF SECURITY ACTIVITIES

PERFORMANCE OBJECTIVE: **Safety aspects of security activities involving use of weapons and other protective force equipment in the vicinity of safety systems and/or hazardous materials should be identified and understood by all involved parties.**

FINDINGS:

- All Hanford Patrol personnel receive basic safety training in radiation protection, criticality, hazardous (dangerous) materials, and the effects of bullet impact on equipment and piping.
- Specific Grout Treatment Facility safety training was provided to Hanford Patrol personnel as a conservative response to requirements related to permits for new facilities. The Appraisal Team agrees that such training for the Tank Farm is beneficial and conservative.
- The Security Organization has designated individuals to provide liaison with the Industrial Hygiene and Safety Organization, and with management of each of the 200 Areas, to assure proper coordination of safety issues related to security.

CONCERN: None.

I. EXPERIMENTAL ACTIVITIES

The Experimental Activities Performance Objectives are not applicable to this facility and, therefore, are not being addressed.

J. FACILITY SAFETY REVIEW

The independent safety review functions provided by the WHC Nuclear Facility Safety (NFS) Group, the Safety and Environmental Advisory Council, and the Waste Management Subcouncil satisfy the requirements of DOE 5480.5, Section 9.

Safety questions are reviewed, and the WHC President is advised on safety issues, by the Safety and Environmental Advisory Council and the Waste Management Subcouncil. The primary responsibility for safety rests with the line organization. Technical analyses are performed by the Safety Support Services Group in the Safety Organization. The NFS Group, also part of the Safety Organization, performs an independent review function. The Appraisal Team found that there was adequate separation of responsibilities between the Safety Support Services and NFS Groups and that no conflict of interest existed. Independent review of the Tank Farm is performed by the Defense Waste Storage Safety Group. This group is part of the NFS Group.

Inadequate staffing in the NFS Group limits the ability of this group to pro-actively pursue safety issues. WHC has indicated that inadequacies exist in cognizant and project engineer's understanding of safety requirements and of the Impact Level system. The Impact Level assigned to a project by a cognizant engineer determines the thoroughness and priority of review by NFS. The possibility exists that projects with safety significance will not receive an adequate independent review if the project is assigned a lower than appropriate Impact Level.

A triennial appraisal was performed in 1988 by WHC managers. The NFS Group performs annual appraisals which the Appraisal Team found to be thorough and of high quality.

FR. 1 SAFETY REVIEW COMMITTEE

PERFORMANCE OBJECTIVE: A safety committee should be available to review safety questions.

FINDINGS:

- o Safety questions are reviewed by several safety committees and by an independent internal group.
- o The independent safety review function, as required by DOE 5480.5, is performed by the Nuclear Facility Safety (NFS) Group, augmented by the Safety and Environmental Advisory Council (SEAC) and its subcouncils. The SEAC Waste Management Subcouncil (WMSC) performs the review function for the Tank Farm.
- o The SEAC and the WMSC members are appointed by the WHC president. The SEAC and WMSC advise the WHC president. The charter and responsibilities of the Groups are specified in Organization Charts and Charters, WHC-CM-1-2, Section CH-CC 5, Rev. 1, December 23, 1987.
- o The SEAC and the WMSC are multidisciplinary and provide group interaction. The SEAC and WMSC members are permanently appointed. Ad hoc subcommittees may be formed as necessary to perform specific reviews.
- o Independent review of the Tank Farm is performed by the Defense Waste Storage Safety (DWSS) Group. This group is part of the NFS Group. The NFS Group reports through the Safety Department to the WHC President.
- o The responsibilities and charters for the Safety Department, including those of the NFS Group, are contained in WHC-CM-1-2, Section CH-3.3, Rev. 1, December, 23, 1987.
- o The primary responsibility for safety rests with the line organizations. Technical analyses and expertise in various safety areas is supplied by the Safety Support Services (SSS) Group which is also part of the Safety Group. The NFS Group is responsible for providing an independent review of the analyses performed by SSS. The Appraisal Team found that there was adequate separation of responsibilities between the SSS and NFS Groups and that no conflict of interest existed.

CONCERN: None.

FR. 2 SAFETY REVIEW TOPICS

PERFORMANCE OBJECTIVE: Items that require review by the safety committee should be well defined and understood by facility management.

FINDINGS:

- Topics requiring review by safety committees are well understood by Tank Farm Management.
- Management Policies, MP 5.15 requires line organizations to obtain reviews from the Safety and Environmental Advisory Council (SEAC) on matters in the following areas: (1) safety analyses, (2) proposals for conducting research programs involving potential for significant hazard or accidents outside the scope of approved SARs, (3) plans for recovery from major accidents, (4) proposed changes in the mode of operation or modification of existing facilities involving an Unreviewed Safety Question, and (5) Environmental Program Plans and Environmental Impact Statements.
- Organization Charts and Charters, CH-CC-5, Rev. 1 states that SEAC Waste Management Subcouncil (WMSC) review is mandatory for all new facilities and plant modifications (either hardware or software) with significant safety impact. The WMSC is charged with review and support of ongoing environmental and safety matters associated with various waste management activities, including the Tank Farm.
- The SEAC Packaging and Shipping Subcouncil provides multidisciplinary review and support of safety and environmental aspects of packaging and shipping of radioactive/hazardous/extremely hazardous or dangerous materials. Packaging and Shipping Subcouncil review is mandatory for: (1) all Safety Analysis Reports for Packaging, (2) all significant changes to administrative controls and modifications to containers, and (3) the periodic update of onsite material packaging and shipping manuals.
- Organization Charts and Charters, CH 3.3, Rev. 1, "Safety," indicates that the responsibility for independent safety oversight is assigned to the Safety Organization, and specifically states that this organization is responsible for the overview of operations and for assuring compliance with all DOE Orders. This responsibility is assigned to the Nuclear Facility Safety Group within the Safety Organization.
- Safety responsibilities and authorities are defined in Management Policies, MP 5.6, "Nuclear Facility Safety", and

Management Requirements and Procedures, MRP 5.23 "Nuclear Facility Safety."

CONCERN: None.

FR. 3 OPERATION OF SAFETY COMMITTEE

PERFORMANCE OBJECTIVE: Review of facility activities by the safety committee should ensure achievement of a high degree of safety.

FINDINGS:

- o This performance objective is not being fully met, in that the independent safety function is not pro-active and the independent review process could be bypassed.

- o Management Policies, MP 5.15, "Safety and Environmental Advisory Council," assigns the Safety and Environmental Advisory Counsel (SEAC) the responsibility for reviewing "...adherence to and major changes to policy and practices associated with design, construction, startup, operations, maintenance, modifications, and decommissioning of WHC facilities with respect to safety and environmental protection."

- o The SEAC and its subcouncils have the authority, at their option, to review other safety-related matters for which council review is judged appropriate.

- o The SEAC meets approximately once each month. The SEAC Waste Management Subcouncil has regularly scheduled meetings twice each month. In these meetings action items are assigned to specific individuals. Minutes of previous meetings are used to track the action items to completion. Minutes are sent to the President of WHC, top mangers, and meeting attendees.

- o Resolution of comments is required for SEAC concurrence in actions involving its mandatory review. Line managers are required to assure that WHC is not committed to policies or actions that receive unfavorable review by the SEAC, unless resolved in writing by the President of WHC.

- o The line organization is responsible for generating safety documentation and for resolving comments from those required to provide a review, including Nuclear Facility Safety (NFS).

- o A formal review and sign-off is required for Critiques and Unusual Occurrence Reports. All Event Fact Sheets are submitted to NFS.

- o The Impact Level system, as described in "Impact Levels", Management Requirements and Procedures, WHC-CM-1-3, Section MRP 5.43, Rev. 3, February 15, 1989 provides a graded system of control which reflects the importance of programs, projects, facilities, and equipment based on their

complexity, cost, schedule, safety, consequences of failure, and compliance with standards and regulations.

- o Impact Level 1 indicates that the potential exists for a hazard to onsite or offsite personnel or to the environment. Impact Level 4 indicates an insignificant potential for hazards.

- * The depth and priority of review by the Defense Waste Storage Safety (DWSS) Group is based on the assigned Impact Level. Projects having Impact Level 1 or 2 must be reviewed and approved by DWSS prior to the project's implementation. Reviews of projects having Impact Levels 3 or 4 may occur after the project has been implemented.

- * Impact Levels are assigned initially by project cognizant engineers. The "1988 Tank Farm Annual Integrated Safety Appraisal" found that responsible personnel are not able to determine, or are improperly determining, Impact Levels due to a lack of cognizance and direction. (See Performance Objective TS.1)

- * The DWSS Group can challenge the Impact Level assigned to a given project. The nature of the project is one method of intercepting projects with too low an Impact Level. However, given the manpower shortage which exist in the DWSS Group, there is no positive assurance that all projects having an improperly assigned low Impact Level will be detected.

- * The "1988 Tank Farm Annual Integrated Safety Appraisal" also found that cognizant and project engineer awareness of DOE orders and WHC policy regarding the need for safety evaluation is less than adequate.

CONCERN: (FR.3-1) (H2/C3) The possibility exists that projects with safety significance will not receive an adequate independent review if the project is assigned lower than appropriate Impact Levels.

- o The DWSS Group performs unannounced reviews of specific operational tasks within the Tank Farm. These are called Operational Safety Assessments. This is a field review for compliance with previously selected approved procedures or work plans. This is done about every other month for the Tank Farm.

- * The DWSS Group is responsible for reviewing safety issues related to the Tank Farm. The manager, to whom the DWSS Group reports, indicated that staff members should spend 75 percent of their time in the office conducting reviews and 25 percent of their time in the field interacting with Tank Farm personnel. However, staffing limitations have resulted in

each member of the group working 10 to 20 hours of overtime per week dealing with paperwork and document reviews. This has limited the ability of the DWSS Group to pro-actively search-out safety issues. Active recruitment of personnel to fill vacancies in the DWSS Group is underway.

CONCERN: (FR.3-2) (H2/C3) The Defense Waste Storage Safety Group is not adequately pro-active in searching out safety issues through visits to facilities and routine interaction with Tank Farm personnel.

FR. 4 ANNUAL FACILITY SAFETY REVIEW

PERFORMANCE OBJECTIVE: An annual operating review of the facility should be performed by a committee appointed by top contractor management.

FINDINGS:

- o An annual operating review of the facility is being performed by a committee appointed by WHC management.
- o The previous annual review is documented in "1988 Tank Farm Annual Integrated Safety Appraisal", February 14, 1989. This report addresses all of the required areas in DOE 5480.5.
- o The quality and thoroughness of the annual report was judged by the Appraisal Team to be very high.

CONCERN: None.

FR. 5 TRIENNIAL APPRAISAL OF FACILITY SAFETY REVIEW SYSTEM

PERFORMANCE OBJECTIVE: A triennial appraisal of the safety review system should be performed by contractor management.

FINDINGS:

- o A triennial appraisal of the safety review system was performed by WHC managers within the last year.
- o The previous review is documented in the report "Triennial Review of the Westinghouse Hanford Company Independent Safety Appraisal System," November 30, 1988.
- o This is the first triennial appraisal performed since the consolidation of the Hanford project.
- o The Appraisal Team found this appraisal to be sufficiently thorough and of good quality.

CONCERN: None.

K. NUCLEAR CRITICALITY SAFETY

The Nuclear Criticality Safety Performance Objectives are not applicable to this facility and, therefore, are not being addressed.

L. RADIOLOGICAL PROTECTION

A Radiological Protection Organization is in place and functioning. The training, experience and capabilities of the professional staff are excellent. Interviews and observations of Radiation Protection Technologists (RPTs) indicate a sound training program. The high attrition rate of 1988 apparently has been reduced to industry norms.

Supervisors are unnecessarily restricted from performing independent assessments or preplanning of work in radiation and contaminated areas because of the requirements to be accompanied while in the area and surveyed at the exit by an RPT.

Program effectiveness is being evaluated, however, tracking and trending of Radiological Problem Reports is not being done.

WHC has put in place an integrated set of manuals and procedures defining the program requirements. These manuals and procedures require updating to reflect the new requirements contained in DOE 5480.11.

Although dose levels of personnel are low, exposure reduction efforts are not well documented. A lack of management attention to the ALARA process is evidenced by the absence of written charters for the ALARA Committee or the ALARA Team and failure to schedule ALARA Team meetings for the last 6 months.

Procedural criteria are needed to enable the RPTs to assess radiation exposure levels to determine the need for a beta photon dosimeter.

The air monitoring program has not been implemented in accordance with criteria established by WHC. Additionally, the tracking and trending of low activity air samples for possible buildup is not being done.

A scheduled Radiation Survey Program has been implemented for which a Noteworthy Practice has been written. However, review of completed surveys by a radiation protection supervisor was not done and the procedure for operation of air sample counting equipment was not followed.

A plan and schedule is needed to expedite the installation of portal contamination monitors.

RP.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Facility organization and administration should ensure effective implementation and control of radiological protection activities within the facility.

FINDINGS:

- o The organization and administration of the Tank Farm Health Physics Group is effective and meets the requirements of this Performance Objective.

- * Responsibilities for radiological protection are clearly defined for all personnel in the hierarchy of documents implementing the program. It is clearly stated and accepted that radiological protection is a line management responsibility.

- * Radiation Protection Technologist (RPT) supervisors need to perform independent assessment of subordinate's performance. All supervisors are expected to preplan their work in contaminated areas. Presently, RPTs are required to accompany supervisors while inside radiological areas and to survey supervisors at the exits of contaminated areas. This practice provides an unnecessary impediment to supervisors in carrying out their jobs.

CONCERN: (RP.1-1) (H3/C2) Supervisors are unnecessarily restricted from performing independent assessment of subordinate's performance or proper pre-planning of work in contaminated areas because of the requirement to be accompanied and surveyed by an RPT.

FINDINGS:

- o The Tank Farm Health Physics Group is staffed by approximately 40 RPTs, two Health Physics Supervisors, and three Health Physics Area Engineers. Radiological Engineering & ALARA, Health Physics Support, and a Dosimetry Group provide additional support. The Tank Farm Health Physics Staff has excellent training and background. Over 60 percent of the RPTs have formal training. At present, the Tank Farm is understaffed by seven RPTs and one Health Physics Area Engineer. The attrition rate for 200 Area RPTs in 1988 was 33 percent. Currently, the attrition rate is approximately one to two percent per month. The effect of this attrition is that over 60 percent of the RPTs at the Tank Farm have less than five years experience. There are two supervisor positions. One is filled by an individual with less than one year of experience and the other is filled by an acting supervisor. A permanent supervisor is to be named in the near future. A group of 20 RPT trainees will complete the first part of their training in May, 1989.

Health physics management has taken aggressive steps to mitigate the effects of manpower shortages and lack of experience. Personnel shortages are being managed through careful job planning to maximize the use of available RPTs and to minimize overtime requirements.

* Facility managers have access to data related to occupational radiation exposures, personnel contaminations, radioactive wastes, etc. for which trend analysis can be done, however, participation in the ALARA process has been marginal.

CONCERN: See Concern RP.12-1.

FINDINGS:

- o Radiological protection personnel are actively engaged in development and revision of health physics procedures through participation on the Field Change Review Team.
- o Radiological protection performance is assessed monthly by individual area managers.
- o The Nuclear Facility Safety Group has established an appraisal program in accordance with DOE 5482.1B, Section 10. Reports and corrective actions resulting from these appraisals are maintained.
- * "Radiological Problem Reports" are being used to identify procedural issues, equipment problems, etc., applicable to radiation protection. Appropriate corrective action is being identified, assigned and completed, however, this data is not being tracked or trended.

CONCERN: (RP.1-2) (H2/C2) Radiological problems are not being tracked or trended.

RP.2 INTERNAL AUDITS AND INVESTIGATIONS

PERFORMANCE OBJECTIVE: The internal audit program for both routine operations and unusual radiological occurrences should provide adequate performance assessments.

FINDINGS:

- The internal audit program and unusual radiological occurrence investigations provide adequate performance assessments.
- WHC Nuclear Facility Safety has the responsibility to conduct the internal audit and appraisal program. This program complies with DOE 5482.1B, Section 10, and DOE 5480.11.
- Audits are conducted once a year, such that all criteria are audited at least once every three years. Audits are documented in an annual report. The 1987 and 1988 "Tank Farm Annual Integrated Safety Appraisal Reports" were reviewed.
- Personnel performing audits have adequate technical backgrounds and experience for this function. They are independent of the Tank Farm Radiation Protection Program, and include radiological engineers and support from PNL.
- Management tracks and coordinates recommendations of each audit to ensure appropriate corrective action is taken.
- Accidents and incidents are investigated by line management through coordination with Nuclear Facility Safety.
- Line Management response to corrective actions and lessons learned are well demonstrated.
- Pre-job planning and analysis of possible radiological safety concerns is thorough and complete, and receives adequate Nuclear Facility Safety support.

CONCERN: None.

RP.3 RADIOLOGICAL PROTECTION PROCEDURES AND POSTING

PERFORMANCE OBJECTIVE: Radiation protection procedures for the control and use of radioactive materials and radiation generation devices should provide for safe operations and for clearly identifying areas of potential hazards.

FINDINGS:

- o Procedures are in place to control radioactive materials and generating devices. However, radiation protection manuals and procedures need updating.
- o WHC has documented policies for radiation protection, Management Policies, WHC-CM-1-1, MP 5.4, Rev. 1; and Management Requirements and Procedures, WHC-CM-1-1, MRP 5.37 and MRP 5.38. These policies require compliance with relevant DOE Orders and ALARA requirements.
- o Radiation Protection, WHC-CM-4-10, Rev. 0 is considered the "second tier" document from which facility specific procedural documents are derived.
- o Four additional manuals implement the guidance of the Radiation Protection manual. These are: Radiological Design Criteria, WHC-CM-4-9; ALARA Program, WHC-CM-4-11; Radiation Work Requirements and Permits, WHC-CM-4-15; and Dosimetry, WHC-CM-4-16.
- o Additional guidance to health physics personnel is provided in: Operational Health Physics Practices, WHC-CM-4-12; Operational Health Physics Procedures, WHC-CM-4-13; and Operational Health Physics Administrative Guide, WHC-CM-4-14.
- o The documentation of the WHC Radiation Protection Program has the necessary hierarchical based system traceable to DOE 5480.11.
- o The radiation protection standards meet or exceed those recommended by the American National Standards Institute, National Council on Radiation Protection and Management, International Commission on Radiological Protection and established industry standards.
- o Radiological controls are in place and adhered to by workers within the radiation control zones through the use of Radiation Work Permits (RWP). Long Term RWPs are valid for a period of 12 months. Temporary RWPs cover a specific job and are not valid longer than 90 days. Special RWPs are used for high radiation/contamination work.

- o All long-term RWPs are compiled in a single document, Radiation Work Requirements and Permits, WHC-CM-4-15, for ease of use and are also posted locally.

- o Procedure administration (including initial development, revision and review) is performed by Health Physics Support.

- o Posting and labeling requirements are clearly defined in "Radiological Posting and Labeling," WHC-CM-4-10, Section 7.0.

- o Extensive use of vendor supplied preprinted posting and labeling is evident.

- o Proper use and maintenance of postings was observed within facilities and open areas.

- o Radiation, contamination and air activity condition are clearly posted within the facilities and are consistent with DOE standards.

- o Sealed sources (primarily check and calibration sources) are inventoried every six months. Procedures are established for control, accountability and leak checks.

- o There are no radiation generating devices within the scope of this appraisal.

- * The WHC manuals and procedures were developed prior to publication of DOE 5480.11 on December 21, 1988. As a result, there are noncompliances in terminology and requirements between WHC manuals and procedures and DOE 5480.11. The "1988 Tank Farm Annual Integrated Safety Appraisal Report" addressed these noncompliances.

- * Plans to update WHC manuals and procedures to be in compliance with DOE 5480.11 are addressed in a Letter to Mr. R. A. Holden, from Mr. S. A. Spohr, "Implementation Plans for Requirements in DOE 5480.11 for Which WHC is Currently Not in Compliance," February 10, 1989.

CONCERN: (RP.3-1) (H2/C1) WHC manuals and procedures have not been revised to reflect the requirements of DOE 5480.11.

RP.4 EXTERNAL RADIATION EXPOSURE CONTROL PROGRAM

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

FINDINGS:

- o The external radiation exposure control program generally minimizes personnel exposure.
- o The external radiation exposure at the Tank Farm is lower than at other facilities on the Hanford Site. In addition, both the total and average dose are considerably below 1987 levels.

	Total Dose Person Rem		Average Dose mrem/mo/person	
Organization	CY 87	CY 88	CY 87	CY 88
Tank Farm Surveillance	19.4	10.8	8.0	3.9
Tank Farm Maintenance	2.4	1.8	3.0	1.7
Tank Farm Health Physics	*	4.9	*	3.9

*Unavailable due to departmental changes.

- * The exposure data, by itself, does not demonstrate that effective exposure control methods were used. No specific dose reduction procedures or efforts were identified. The ALARA Team was not active in coordinating ALARA activities during the last quarter of current year 1988. (See RP.12)
- * Job specific planning for work requiring a special Radiation Work Permit is performed by the responsible work group with input from Health Physics. No job specific results or trending of effectiveness are done.
- * Exposure reduction efforts are not well documented for work at the Tank Farm. This hinders effective evaluation for further reduction efforts. Coordination of exposure reduction efforts in the Tank Farm is lacking.

CONCERN: See Concerns RP.12-1, RP.12-2.

RP.5 EXTERNAL DOSIMETRY (ROUTINE AND ACCIDENT USE)

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

FINDINGS:

- The external dosimetry program is judged to be adequate. Specific concerns are noted which indicate further improvements may be needed.
- PNL provides personnel dosimetry and nuclear accident dosimetry service to WHC. This service is described in PNL-MA-568, Hanford External Dosimetry Program Manual. This service meets the requirements of ANSI N13.5, N13.7, N319 and N323. The service is not certified under the Department of Energy Laboratory Accreditation Program for Personnel Dosimetry. However, PNL has until December 31, 1989, to gain required certification and is performing satisfactorily to a schedule to gain certification.
- Personnel dosimeter processing frequencies are determined by WHC based on personnel exposure potential. Tank Farm radiation workers exchange dosimeters monthly.
- There are no areas within the scope of this Tank Farm appraisal containing sufficient quantities and kinds of material to require criticality monitoring.
- All Radiation Worker trained radiation protection personnel are issued a Personnel Nuclear Accident Dosimeter (PNAD). These PNADs are Los Alamos tested and approved.
- Personnel decontamination facilities are located in each area of the Tank Farm. They are properly stocked and inventoried, and procedures are available to govern their use.
- Personnel exposure histories are available to line management to assist in exposure control.
- Records of personnel exposure are formally maintained by PNL through an interactive computer database with WHC. Computer terminals in the dosimetry group office permit direct access to the PNL-managed database and allow generation of data, summaries, trending and immediate status reports.
- Estimates of dose to the skin, in the event of a significant skin contamination incident, are assessed by WHC dosimetry personnel with assistance from PNL staff using VARSKIN code techniques.

- o Technical criteria are provided in procedures to direct the Radiation Protection Technologist in determining the need for extremity dosimeters and supplemental dosimetry.

- * The beta photon dosimeter is used to supplement the multipurpose dosimeter when doses may result from low energy (<200 Kev) beta radiation. Criteria for use of this device are not available.

CONCERN: (RP.5-1) (H2/C1) Existing procedural criteria do not enable the Radiation Protection Technologist to assess radiation exposure levels that warrant the use of a beta photon dosimeter.

RP.6 INTERNAL RADIATION EXPOSURE CONTROL PROGRAM

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

FINDINGS:

- o Internal radiation exposure controls are judged to be adequate. Specific concerns are noted which indicate further improvements to these controls may be needed.

- o Engineered controls are used to prevent airborne activity in the work place. Ventilation control in the general work place of facilities provides negative pressure differential from areas of lower to higher contamination levels.

- o Temporary enclosures (greenhouses) which have separate High-Efficiency Particulate Air (HEPA) filtered ventilation systems are used on projects involving high levels of contamination and outside areas of the Tank Farm. Wrappings and sleevings are also used to control contamination spread.

- o Alpha Constant Air Monitors (CAMs) are used for stack monitoring in the Tank Farm. Beta CAMs are used throughout the Tank Farm for workplace monitoring and double-shell storage tank annulus monitoring. Filters are changed once per week and counted for long-lived alpha and beta-gamma emitters at sensitivity levels of 1 percent or less of the Derived Air Concentration. Additional passive air samples are also collected and counted on the same frequency.

- * The samples are counted in the Radiation Protection Technologist count room and the central laboratory. The sample results are reviewed and timely notification is made when agreed upon alert levels are reached. Sample results are reported both verbally and on the sample result sheet. No trending is done of low-level activities to identify areas with developing contamination problems or areas with detectable levels at fractions of DAC.

CONCERN: (RP.6-1) (H2/C2) Trending of air sample results to detect low-level radioactive buildup is not performed.

FINDINGS:

- o Respirators are required in any area considered to have potential airborne activity, (e.g. whenever there is a CAM alarm or work is being done on equipment with low levels of contamination). The probability of internal contamination is low and any probable exposure would be from an accidental cause. The historical record indicates a lack of significant internal exposures. This conservative philosophy complies with ANSI Z88.2.

- * Implementation of an air sampling program based on air flows, sample position, breathing zone to general work area correction, etc., has not been accomplished.

CONCERN: See Concern RP.10-1.

RP.7 INTERNAL DOSIMETRY

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

FINDINGS:

- o The internal dosimetry program accurately determines and records personnel internal exposure.
- o The emphasis of the internal dosimetry program is prevention of worker exposure to airborne radionuclides. This has proven to be successful. Historically, skin contaminations have continued to show a downward trend.
- o The Hanford Internal Dosimetry program is administered by PNL. The program is capable of detecting, evaluating and documenting internal dose to personnel. The program is documented in PNL-MA-552, Draft Hanford Internal Dosimetry Manual and PNL DRAFT Technical Basis for Internal Exposure Sources at Hanford.
- o Internal dosimetry measurements are conducted annually, or more often if needed, and are well documented.
- o Radiation Protection Technologist certification training includes internal dosimetry orientation.
- o The WHC Dosimetry Group schedules the routine bioassay and whole body counts.
- o A Radiation Work Restriction notice is sent to an employee's supervisors when personnel fail to leave bioassay samples, fail to report for scheduled whole body counts, or if dose assessments for internal exposure need to be done.
- o Analytical procedures, detection sensitivities, and calculating techniques are well documented.

CONCERN: None.

RP.8 FIXED AND PORTABLE INSTRUMENTATION (NORMAL AND EMERGENCY USE)

PERFORMANCE FINDINGS: Radiological protection instrumentation used to obtain measurements of radioactivity or personnel dosimetry should be calibrated, used, and maintained so that results are accurately determined.

FINDINGS:

- o The fixed and portable instrument programs of WHC and PNL are judged to be adequate. Specific concerns have been noted.
- o Portable instruments are serviced and calibrated on a routine frequency in accordance with ANSI 42.17, N323, N320, N317, 43.1, and 13.10. Proper records are adequately maintained.
- o Adequate quantities of portable and fixed instruments are available. Instruments have sufficient range and detection capability for the types of radiation present.
- o Fixed instruments (Constant Air Monitors, hand and foot counters, radiation area monitors and portable monitors) are serviced and calibrated by Tank Farm instrumentation technicians. Records are adequately maintained.
- * Daily background checks on four air filter sample systems (AIRSAMS) in Bldg. 222S Counting Laboratory were not recorded for three days during this appraisal.
- * The background administrative limits for the AIRSAM sample holders in Bldg. 222S have not been determined as required by Procedure LO-150-115, Rev. A MOD 1, August 25, 1988.

CONCERN: (RP.8-1) (H2/C2) WHC requirements for determination of background radiation limits for air filter sample systems are not being followed.

RP.9 RESPIRATORY PROGRAM

PERFORMANCE OBJECTIVE: The respiratory program should ensure optimum protection against internal radiation exposures to workers.

This Performance Objective is covered under Performance Objective PP.2.

RP.10 AIR MONITORING

PERFORMANCE OBJECTIVE: Air monitoring systems selection, location, calibration, and maintenance should ensure reliable estimates of air activity for radiological control purposes.

FINDINGS:

- o Even though historical internal dosimetry records confirm that administrative controls are preventing significant internal exposure to workers, the air monitoring program does not meet the requirements of DOE 5480.11 or ANSI N13.1

- * Technical criteria and standards for the air sampling/ monitoring program, are reported in SD-SQA-CSD-001, "Criteria for Rockwell Hanford Operations Workplace Air Sampling Program."

- * Specific requirements for upgrade were reported in SD-SQA-PP-001, "Radiological Facility Air Surveillance Upgrade Program."

- * Smoke air flow and direction tests have been completed in the Tank Farm and numerous deficiencies were identified. Implementation of upgrades, based on these tests, has not started.

CONCERN: (RP.10-1) (H2/C1) The air monitoring program has not been implemented in accordance with the criteria established by WHC.

RP.11 RADIOLOGICAL MONITORING/CONTAMINATION CONTROL

PERFORMANCE OBJECTIVE: The radiological monitoring and contamination control program should ensure worker protection from radiological exposures.

FINDINGS:

- o The Radiological Monitoring/Contamination Control Programs are judged to be adequate. Specific concerns are noted which indicate further improvements may be needed.
- o Skin contaminations have consistently decreased each year since 1982. There were five instances of skin contamination in 1987 and one instance to date in 1989.
- o Contamination control practices (such as sleeving of salt well pumps when being pulled) are written into maintenance procedures.
- o Limits of non-detectable activity are used when releasing material and personnel for unrestricted use.
- o Adequate quantities of the various types of necessary protective clothing are available.
- o Exits from the Tank Farm are located in small enclosures with a step-off pad to facilitate a proper self-survey.
- o Adequate procedures and equipment exist to detect personnel contamination above limits, to decontaminate individuals, and to document and investigate personal contaminations.
- o Personnel wearing protective clothing are allowed to co-mingle with personnel in personal clothing. This is most apparent in outside areas of the Tank Farm.
- o Areas such as Bldg. 204 AR are considered and maintained as being potentially contaminated. This necessitates use of protective clothing and Radiation Protection Technologist (RPT) coverage or self-surveying.
- * Use of self-survey and RPT conducted personal contamination surveys continue when state-of-the-art monitoring equipment is available. Portal contamination monitors have been purchased for use at the Tank Farm. However, a plan and schedule for installation has not been developed.

CONCERN: (RP.11-1) (H2/C2) A plan and schedule to expedite the installation of portal contamination monitors at the Tank Farm has not been developed.

FINDINGS:

- o A documented Scheduled Radiation Survey Program is in place at the Tank Farm. The program includes the development of survey task descriptions which state the area, building, location(s), type of survey to be taken; special information to aid the RPT; special circumstances which may be unique to the survey; required instrumentation; and action levels and actions to be taken if they are exceeded. This program establishes survey requirements to be performed each shift, daily, weekly, monthly, quarterly, semiannually, and annually.

- o Institution of this scheduled survey program has increased the number of surveys within the program from 170 to 264. Most of this increase is due to an increase in frequencies and a more clear definition of areas needing to be surveyed.

- o RPTs have been trained in the use of the Scheduled Radiation Survey Program.

- * The 200 West Area Tank Farm initiated the scheduled radiation survey program on February 27, 1989. Since that date none of the surveys have been reviewed by supervision.

CONCERN: (RP.11-2) (H2/C2) Supervisory reviews of radiation surveys are not being performed.

RP.12 ALARA PROGRAM

PERFORMANCE OBJECTIVE: A formally structured, auditable program should be in place with established milestones to ensure that exposures are maintained As-Low-As-Reasonably-Achievable.

FINDINGS:

- o The WHC ALARA program is documented in WHC-CM-1-3, MRP 5.37, and WHC-CM-4-11, ALARA Program. WHC-CM-4-11, Rev 1, which represents a significant improvement over the previous version is scheduled to be issued April 14, 1989. The ALARA program was audited in September 1988.
- o The ALARA program manager and a staff of two ALARA administrators report to the manager, Radiological Engineering and ALARA.
- o The ALARA program places prime responsibility for implementation on line management and expects commitment from all employees.
- * The ALARA program includes a WHC ALARA Committee and ALARA Teams. Neither of these groups have approved written charters.
- * An ALARA Team has been established in the Tank Farm. This team is scheduled to meet monthly but has not held a meeting since September 10, 1988.
- * Participation in, and coordination of the ALARA program in the Tank Farm is lacking.

CONCERN: (RP.12-1) (H2/C2) The ALARA Program in the Tank Farm area has not been fully implemented in accordance with WHC policy.

FINDINGS:

- o ALARA goals are established on an annual basis. The goals for calendar years 1988 and 1989 are clear, measurable, and reflect plant operating conditions. Established goals include dose reduction, skin contamination reduction, radioactive source reduction, contamination control, nonradioactive hazard reduction, ALARA awareness activities and training.

- o For onsite radioactive materials shipments, WHC permits vehicle operators to be exposed to as much as 6 mrem/hr. The Federal standard (49 CFR 173.441) is "2 mrem/hr, unless a formal radiation protection program is established." Operators, managers, and Radiation Protection Technologists report that vehicle operators are rarely exposed to as much as 2 mrem/hr. A review of the Radioactive Shipping Record for the past nine shipments of radioactive liquid waste indicate that the maximum exposure to the train engineer is < 1 mrem/hr. The maximum reading at two meters is 23 mrem/hr.

- o The required quarterly and annual status reports of ALARA goals are submitted to DOE-RL.

- o ALARA is included in radiation worker training and facility specific training which emphasizes methods and techniques to be used to limit exposure.

- o Awareness is encouraged through the use of posters (six within the last year) and awareness topics (three within the last year) which are given very wide distribution and are posted on bulletin boards.

- o Tank Farm Health Physics is involved in pre-job planning and the monitoring of jobs with the potential for significant exposure.

- o ALARA reviews of work to be performed are documented on an ALARA Management Worksheet (AMW). This provides a mechanism to ensure ALARA is included in work planning and that lessons learned at job completion are documented.

- o Dry runs or mockups are used when determined to be beneficial through the AMW.

- * Supervisors and managers are generally aware of exposure trends within their operating areas. However, trend analysis of exposure by craft and area is not being done.

CONCERN: (RP.12-2) (H2/C2) Tracking and trending of data associated with long-term radiation work permits is not being done.

RP.13 RECORDS

PERFORMANCE OBJECTIVE: **Records related to occupational radiation exposure should be maintained in a manner that permits easy retrievability, allows trend analysis, and aids in the protection of an individual and control of radiation exposure.**

FINDINGS:

- o Radiation protection program records are generated and maintained in accordance with applicable orders, standards, and guides.
- o Dosimetry records are maintained by PNL in a central data base at the DOE Federal Building in Richland and through an interactive computer access to the 200 Area Dosimetry Group.
- o Records contain sufficient cross references to permit tracking of bioassay and dosimetry data to specific personnel and technicians.
- o Records are provided in various forms to permit ALARA program effectiveness evaluations.
- o Annual reports are provided to each employee, and visitors are provided with exposure information as required by DOE 5484.1.

CONCERN: None.

M. PERSONNEL PROTECTION

The Personnel Protection Program in the Tank Farm is consistent with the intent of DOE orders, WHC policies, and general industry practices. Comprehensive policies, performance standards, and implementing guides have been issued; line management accountability clearly established; and employee compliance observed. A positive safety attitude and commitment to health and safety objectives is displayed by individual employees and senior management alike. Four items were observed during the appraisal that warrant corrective action to enhance specific elements of the program.

The WHC statistical safety performance is better than DOE, DOE-RL, and industry specific performance averages. There appears to be a downward trend, beginning in 1987, in first-aid cases, recordable injuries and illnesses, and lost workday cases. Occupational illnesses due to chemical exposure, generally rare in DOE facilities, accounted for two Tank Farm lost workday cases in 1987. A similar incident occurred in 1988, but did not result in lost workdays. Improvements in the industrial hygiene program are evident and additional emphasis is scheduled.

The four concerns noted in the Personnel Protection Program directly relate to enhancement of the industrial hygiene program. Specifically, (1) the Emergency Readiness capabilities for non-radiological chemical hazards warrant further development and proficiency demonstration; (2) there is a need for enhancing the chemical characterization of waste tanks; (3) staffing and skills for technicians assigned to the Tank Farm should be improved to facilitate effective program implementation; and (4) routine surveillance to confirm the adequacy of chemical hazard containment is required. WHC is addressing similar program deficiencies in other Hanford facilities. The Tank Farm has not been assigned a high priority relative to other facilities in the implementation of program improvements. The Appraisal Team concurs with the priority assigned by WHC; however, timely implementation is warranted.

Typical of the excellent WHC programs observed are hazard communication, respiratory protection, and asbestos materials management and abatement. The Job Package Review System, the Hazardous Work Permit System, line management accountability, and available technical oversight are examples of strong resources available to WHC for continued improvement in the Tank Farm Personnel Protection Program.

PP.1 INDUSTRIAL HYGIENE PROGRAM CONTENT

PERFORMANCE OBJECTIVE: The industrial hygiene program should minimize the probability of employee illness, impaired health or significant discomfort by identifying, evaluating and controlling those stresses arising in the workplace.

FINDINGS:

- o WHC has implemented an industrial hygiene program that meets or exceeds industry practices; complies with the intent of DOE orders; and has demonstrated proficiency in identifying, evaluating, and controlling chemical and physical stress in the workplace. However, the WHC non-radiological emergency response capabilities are not adequate.

- o Consistent with DOE-RL Hanford site cost containment practices, the WHC industrial hygiene program is dependent on technical support services provided by the Hanford Environmental Health Foundation (HEHF), another Hanford site contractor. This arrangement is intended to avoid unnecessary duplication of costs in the administration and resourcing of support service requirements common to multiple site contractors. Comprehensive review of HEHF programs was beyond the scope of this appraisal; however, no deficiencies were observed in the technical services provided in the Tank Farm.

- o The program is well documented in formal policies, procedures, and directives (WHC-CM-4-3, Industrial Safety Manual, Volumes I, II, and III; and WHC-IP-0030, Industrial Safety Instructions). The program includes, but is not limited to, the following elements:

  - Periodic walk-thru surveys,
  - Review of purchase orders,
  - Design review of facility/operational design documents,
  - Review of proposed new activities and modifications to existing operations,
  - Formal recommendations of control measures are made to first level supervisors,
  - Formal assessments of potential hazards, including field monitoring and data collection and analysis, and
  - The ALARA concept is applied to chemical and physical stresses (ALARA Program, WHC-CM-1-3, MRP 5.37).

- o Facility tours and review of incident reports indicate employees observe safety and health rules and use prescribed personal protective equipment. It is similarly evident that supervisors implement industrial hygiene recommendations.

- o The hierarchy of recommendations for control of hazards favors engineering control, process changes or material substitution, where possible; then administrative control; and finally, personal protective equipment.

- o Good hygiene is maintained through work practices such as the use of protective clothing, bans on eating and smoking in regulated areas, and the availability of showers and change rooms.

- o Control measures are implemented when potential health hazards are identified. This is accomplished by work package review, design reviews, documented recommendations to first line supervisors, and/or the hazardous work permit system.

- o Other than asbestos, there are no known carcinogens within the Tank Farm. The asbestos program is described in Industrial Safety Manual, WHC-CM-4-3, Volumes 1 and 2, Section C-3. This program has been extensively reviewed and significantly improved in the past two years. The asbestos program substantially exceeds regulatory minimum requirements and general industry practices.

- o Specific procedures exist to address other potential hazards in the Tank Farm including: heat stress (Industrial Safety Manual, WHC-CM-4-3, Volume II, Guide W-6), confined space entry (Guide W-13), noise (Guide W-7), and basic sanitation (Guide W-2).

- * The proficiency of the emergency preparedness/emergency response capabilities of the industrial hygiene program have not been demonstrated in the Tank Farm. Previous WHC exercises at other site locations (i.e., code names "Elliott" and "Caesar") indicated some deficiencies and reassignment of emergency support response duties. Non-radiological emergency response is not included in routine drills or training for Tank Farm personnel.

CONCERN: See Concern ER.1-1.

PP.2 CHEMICAL CONTAMINATION

PERFORMANCE OBJECTIVE: Chemicals should be controlled so as to minimize contamination of areas, equipment, and personnel.

FINDINGS:

- o Facility tours and review of operating policies, procedures, and directives confirm that Tank Farm operations successfully meet this objective. An excellent personal protective equipment program, including respiratory protection, aids in minimizing personnel exposure. One incident was noted, involving a loss of adequate containment (cited in PP.4 and PP.5), but the corrective action was consistent with the Performance Objective.

- o The Tank Farm management is involved in the ALARA program which includes non-radiological materials and physical stress.

- o The ALARA Program is directed by: ALARA Program, WHC-CM-1-3 MRP 5.37; The ALARA Program, WHC-CM-4-11; and Packing and Transportation of Hazardous Materials, WHC-CM-5-20. These manuals set forth the requirements and responsibilities for controlling contamination of areas, equipment, and personnel. Industrial Safety Manual, WHC-CM-4-3, Vol. 1, provides management with current requirements for protecting the work force from physical, chemical, and biological hazards. Guides for implementing the requirements are found in WHC-CM-4-3, Vol. 2.

- o "Industrial Safety and Fire Protection," WHC-CM-1-3 MRP 5.7, states that management shall evaluate the hazards of newly introduced materials, equipment, and programs, and shall devise methods of protection.

- o A preventive maintenance program is in-place for leak detection, functional checks, and system calibrations of process equipment and environmental controls.

- o Industrial Safety and Fire Protection (IS&FP) conducts air monitoring in the Tank Farm upon request. Hanford Environmental Health Foundation (HEHF) personnel perform monitoring upon IS&FP request.

- o Housekeeping requirements are noted in Tank Farm Surveillance and Operations Administration, WHC-CM-5-7, procedure 3.1.

- o The Respiratory Protection Program is documented in WHC-CM-4-3, Vol. 3. In addition, requirements for respiratory protection against radioactive aerosols are found in Radiation Protection, WHC-CM-4-10. Quantitative fit testing is conducted by HEHF during scheduled employee physical examinations. Qualitative fit tests are administer by WHC-CM-4-13 Procedure 6.4.4. Mechanically supplied and/or compressed air meets grade "E" criteria.

- o Respirators are maintained, cleaned, sanitized, tested and repaired at the respirator maintenance facility. The Respiratory Protection Program meets or exceeds regulatory and industry standards.

- * The contents of waste tanks have not been accurately characterized for non-radiological components. Resource Conservation and Recovery Act-type analyses of single shell tank wastes are included in a program that extends to CY 1997. The double shell tank wastes are characterized for grout technology purposes in an on-going program. Several other special studies have been completed over the years for specific technical purposes. There was no specific source identified for confirming head space gases that may be vented under operating or accidental conditions. Personnel in the operations, engineering, safety, or maintenance functions do not appear to be adequately informed of the characteristics of Tank Farm waste, on a tank or system specific basis, to reliably predict potential impacts or consequences on a job/task basis.

CONCERN: (PP.2-1) (H2/C2) The limited availability of non-radiological chemical characterization of waste tank contents adversely impacts the reliability of reviews of potential hazards, accurate identification of necessary controls, and emergency response actions associated with Tank Farm activities.

PP.3 HAZARD COMMUNICATION

PERFORMANCE OBJECTIVE: Facility personnel should be adequately informed of chemical, physical, and biological stresses they may encounter in their work environment.

FINDINGS:

- o WHC has successfully implemented a formal, comprehensive hazard communication program which meets this performance objective.
- o The hazard communication program is mandated through Industrial Safety Manual, WHC-CM-4-3, Volumes 1 and 2 (Standard HC-1 and Guide HC-1).
- o Interviewed personnel were knowledgeable of the availability, location, content, and use of facility Material Safety Data Sheet manuals. They were also knowledgeable of supplemental information resources. The individuals utilized the available information.
- o Labeling, storage, and use of chemicals was observed to be consistent with policies, procedures, and accepted good practices.
- o Pre-job work packages, safety meetings, and operating procedures were observed to identify hazardous material as applicable on a case-by-case basis.

CONCERN: None.

PP.4 STAFFING

PERFORMANCE OBJECTIVE: The evaluation of chemicals and physical and biological stresses should be performed by personnel that have the knowledge and practical abilities necessary to implement personnel protection practices effectively.

FINDINGS:

- o WHC has highly qualified personnel resources to support the Personal Protection Program. The personnel have the knowledge and practical abilities to develop, implement, and sustain effective personal protection practices. However, one concern about the adequacy of personnel resources is noted below.

- o The technical resources of WHC are supplemented with the capabilities of the Hanford Environmental Health Foundation, the onsite occupational and environmental health support services contractor.

- o The authority and responsibilities of line managers and WHC resources and oversight organizations are defined in organizational charters and management policy ("Industrial Safety and Fire Protection," WHC-MRP-5.7; "Nuclear Facilities Safety," WHC-MPR-5.2). Stop-work authority is clearly supported in management directives and supplemental directives.

- o Significant increases in program demands in the personnel protection areas have occurred in the past few years in most DOE facilities including the Tank Farm. Programs requiring additional resources for emergency preparedness and routine surveillance have been identified and prioritized. The Tank Farm is not considered to include high priority facilities (relative to other Hanford facilities) for additional personnel resource allocation.

- * Two previous TSAs in the Hanford 200 Areas (PUREX, 1988; and Plutonium Finishing Plant, 1987) identified the need for routine surveillance (monitoring) of non-radiological chemical hazards. This need was also identified in the Tank Farm, but implementation is not scheduled until FY 1990.

- * Personnel assigned emergency monitoring responsibilities (Personal Protective Equipment Technicians) have minimal experience in independent hazard recognition, confirmation and assessment under emergency conditions.

* A 1987 incident in the Tank Farm involving exposure to chemical irritants (assumed to be ammonia fumes) confirmed the need for additional skills, and their timely availability, in hazard recognition and assessment.

CONCERN: (PP.4-1) (H2/C2) Trained personnel resources are inadequate to meet the hazard identification, emergency response, and routine surveillance (monitoring) requirements necessary to fully implement the Personnel Protection Program.

PP.5 SURVEILLANCE

PERFORMANCE OBJECTIVE: The surveillance of chemical, physical and biological stresses should ensure that potential personnel exposures are accurately determined and recorded.

FINDINGS:

- o WHC has available the technical resources necessary to accurately monitor and record potential personnel exposure to chemical and physical stresses. Currently, monitoring is performed as deemed appropriate by the professional judgement of Industrial Safety and Fire Protection personnel, or upon specific request. However, a routine monitoring program is not in place to assure the continued satisfactory implementation of this Performance Objective. The Tank Farm is not assigned a high priority for implementing the WHC industrial hygiene surveillance program.

- o With the exception of asbestos, there is no program in the Tank Farm to routinely obtain and record data characterizing physical and chemical stresses. The effectiveness of administrative and emergency controls can only be assessed by the lack of adverse incidents, rather than objective data.

- * The contents of waste tanks, including the head space gases which may be vented under operating or accident conditions, have not been accurately characterized for non-radiological components. A 1987 incident involved two lost workday cases due to excessive exposure to ammonia fumes. A contributing factor was a lack of knowledge of the potential concentrations or the effects of unprotected exposure. In addition, the presence of organic vapors may have masked the irritating fumes that otherwise might give warning of the presence of ammonia.

- * Other materials observed or known to be present, in the Tank Farm, include: hexone, methanol, inorganic acids, and strong caustics. Essentially no data exists regarding potential personnel exposure levels. It is important to note that the Appraisal Team does not suggest excessive exposures to chemicals occur. However, the lack of objective data is not consistent with DOE 5480.10, Paragraph 9.b.(4), or the intent of this Performance Objective. This item was noted in previous TSAs of WHC facilities (PUREX, 1988 and the Plutonium Finishing Plant, 1987).

CONCERN: (PP.5-1) (H2/C1) WHC has not implemented a periodic monitoring program, as required by DOE 5480.10, to assure the continued effectiveness of controls for physical and chemical stresses.

PP.6 HAZARD EVALUATION

PERFORMANCE OBJECTIVE: An evaluation of potential exposures to chemical, physical, and biological agents should ensure effective implementation and control of personnel protection activities within the facility.

FINDINGS:

- o WHC provides hazard evaluations thru comprehensive assessments performed by Industrial Safety and Fire Protection (IS&FP) and/or Hanford Environmental Health Foundation (HEHF).

- o The resources necessary for comprehensive evaluations are readily available and include, but are not limited to the following:

  - Qualified industrial hygienists and safety professionals at IS&FP and HEHF;

  - Complete libraries of applicable codes, standards and regulations;

  - Hazard evaluation reports issued to responsible parties, including first level supervisors; and

  - Resources/capabilities exist to assign safe working limits/controls in the absence of applicable standards.

- o Site assessments are conducted in response to employee and/or management requests, IS&FP walkthrough inspections, audits, appraisals, or operational changes (modifications, additions, and deviations). The scope of such assessments is generally based on the professional judgement of the responsible IS&FP Engineer.

- o Facility tours indicated evaluations of potential exposures to chemical and physical agents has consistently resulted in effective implementation and control of personnel protection activities.

CONCERN: None.

PP.7 OCCUPATIONAL SAFETY

PERFORMANCE OBJECTIVE: All workplaces of the facility should be as free as possible from occupational safety hazards so that employees are effectively protected against accidental death or injury.

FINDINGS:

- o Tank Farm Operations were generally observed to be free from uncontrolled occupational safety hazards. However, several violations of safe work practices were observed, including the absence of clearance markings on the floors, depicting safe distances from machines, in Building 272-AW. Several persons in this area were also observed to violate posted safety requirements for wearing safety glasses. In Building 215-C, compressed gas cylinders were observed to be unmarked and not properly secured.

- o The WHC Statistical Safety Performance is better than the DOE and DOE-RL averages and National Safety Council industry specific averages.

STATISTICAL SAFETY PERFORMANCE

	WHC[1]	DOE[2]	DOE/RL[2]	NRC[3]
Recordable injury incidence rate (RIIR)	0.95	2.2	1.8	6.5
Lost workday case incidence rate (LWDCIR)	0.46	1.1	0.7	2.8

[1] 1988 Data Expressed; 1983-88 RIIR Range 0.95-1.77 and LWCIR Range 0.40-0.58.
[2] 1983 - 1987 Average (Latest Available Data)
[3] 1982 - 1986 Average (Latest Available Data)

- o There have been no recordable injuries or illnesses in the Tank Farm to date in CY 1989. First aid, recordable, and lost workday cases have shown a desirable downward trend since 1987.

- o Policies and management directives clearly define responsibilities for controlling occupational hazards at all levels within the organization. These policies and directives are given in Management Policies, WHC-CM-1-1; Management Requirements and Procedures, WHC-MRP-5.7, and the Industrial Safety and Fire Protection Charters.

- o Directives have been issued in WHC-MRP-5.7 to identify the responsibilities of safety, line management, and employees for ensuring a safe and healthful place of employment. These directives include requirements for:

  - Performing periodic facility safety audits, appraisals, reviews and inspections;
  - Evaluating potential hazards of new/altered equipment;
  - Ensuring that each employee receives adequate safety training to enable safe job performance;
  - Promoting the ALARA philosophy and attitude within all organizations; and
  - Evaluating, reporting, and documenting occupational accidents, illnesses, and injuries.

- o A professional safety staff is available to identify and evaluate workplace safety hazards.

- o Appropriate personal protective equipment is made available to employees.

- o Management Requirements and Procedures, WHC-CM-1-3, and "Disciplinary action for Standards of Conduct Infractions," MRP 4.16, address safety requirements and the penalties for violation of safety rules. "Operations General Administration Procedure" WHC-CM-5-5, G.A. 2.4, requires that procedures define safe methods for performing tasks and that employees follow the procedures.

- o Machine guards are in place for machines with moving and rotating parts. With rare exceptions, compressed gas cylinders are properly inspected, stored, and maintained.

- o Management Requirements and Procedures, WHC-CM-1-3, and "Investigation and Reporting of Health, Safety or Programmatic Events and Unusual Occurrences," MRP 5.14, dictate the requirements and responsibilities for investigation and reporting. Industrial Safety Manual, Standard WHC-CM-4-3, A-2, "Accident and Injury Notification and Reporting," addresses requirements applicable to accident and injury reporting.

- o The "Industrial Safety and Fire Protection (IS&FP) Surveillance Program," WHC-IP-0030, provides a system for planning, conducting, documenting, and tracking work place surveillances. Surveillance activities include appraisals, surveys, audits, and inspections. The surveillance results are reported to management for corrective action. Follow-up

on corrective actions is performed by the person who conducted the surveillance or by the person designated by IS&FP.

- o There are several systems in place to apprise management of occupational safety problems arising in the workplace:
  - Employee concern program,
  - Safety meeting report forms, and
  - Shift logs (Shift logs may be used to record unsafe conditions [Operations - General Administration, WHC-CM-5-5, Procedure G.A. - 1.5]).
- o A new Hoisting and Rigging manual, WHC-CM-6-4, has been issued which defines and consolidates the requirements for the design, procurement, fabrication, inspection, installation, operation, maintenance, and testing of all lifting equipment used on the Hanford Site.
- o "Investigation and Reporting of Health, Safety or Programmatic Events, and Unusual Occurrences," MRP-5.14, details the formal reporting and notification system for injuries and accidents. Complaints and the Report of Occupational Safety Hazards may be reported by employees consistent with requirements of the Occupational Safety and Health Administration rights and responsibilities described in DOE 5480.2; or WHC Policy MRP-4.14, "Resolution of Employee Concerns."

CONCERN: None.

N. FIRE PROTECTION

WHC fire protection policies are defined in Industrial Safety Manual, WHC-CM-4-3. The requirements of this manual are not being fully implemented at the Tank Farm.

DOE 5480.7 requires that contractor operated facilities meet the requirements for "improved risk" or "highly protected risk" rating as defined by the industrial and nuclear insurance industries. DOE 5480.7 establishes the requirements for "improved risks" and states, "Above all other requirements, to qualify for an improved risk rating, it is necessary that strong, tangible evidence be available attesting to the existence of sincere interest by management and employees in minimizing loss due to fire and related perils." A commitment by management to implement basic fire loss prevention programs at the Tank Farm is not evident.

The overall responsibility for implementing fire loss prevention programs throughout the Tank Farm is not clearly defined. Basic procedures relating to fire protection valve inspections, fire protection system impairment permit procedures, and non-emergency use of fire hydrants are not being properly implemented.

Special hazard fire extinguishing systems, specifically water spray systems in Bldgs. 242A and 242S, are not designed and installed in conformance with National Fire Protection Association standards. WHC policies do not assure that designs or projects which may impact fire loss prevention objectives are reviewed by Fire Protection Engineering. Fire Protection Engineering input was not utilized in the design review process for the Grout Treatment Facility (GTF) and GTF fire protection system.

At present, the Tank Farm does not qualify for an improved risk rating due to: (1) the lack of a person assigned the responsibility to implement fire loss prevention programs, (2) the failure to implement basic fire loss prevention procedures, (3) the lack of conformance to national consensus standards of special hazards fire extinguishing systems, and 4) the failure to effectively use available fire protection engineering expertise in review of projects.

FP.1 LIFE PROTECTION

PERFORMANCE OBJECTIVE: The facility should not present an unacceptable hazard to life from the results of accidental fire.

FINDINGS: * The Tank Farm was observed to comply with National Fire Protection Association (NFPA) Life Safety Code No. 101-1988 with the following exceptions:

- The exterior exit doors in the Condenser Rooms in Bldgs. 242A and 242S require excessive force to open;

- The use of exit ladders from the Condenser Rooms in Bldgs. 242A and 242S does not conform to the current (1988) edition of the Life Safety Code for occupancy greater than three persons. (This issue was previously addressed, in the contractor's 1982 Fire Protection Survey, as conforming to the 1981 Life Safety Code. A subsequent change to the Code has resulted in this non-conformance.)

CONCERN: (FP.1-1) (HC1/C1) The fire exits from the Condenser Rooms in Bldgs. 242A and 242S do not conform to National Fire Protection Association, Life Safety Code No. 101-1988.

FP.2 PUBLIC PROTECTION

PERFORMANCE OBJECTIVE: The facility should not pose an added threat to the public as the result of an onsite fire permitting the release of hazardous materials beyond the site boundary.

FINDINGS:

- Contractor prepared SARs and Fire Protection Surveys conclude that offsite release of hazardous materials, in the event of a credible postulated fire, is not likely at the Tank Farm. (See Concern FP.5-3)
- The Hanford Fire Department can initiate control and limitation measures in the event of fire.

CONCERN: None.

FP.3 IMPAIRMENT OF OPERATIONS

PERFORMANCE OBJECTIVE: The facility should not be vulnerable to being shut down for an unacceptable period as the result of a credible fire.

FINDINGS:

- o Contractor prepared Fire Protection Surveys of the Tank Farm conclude that the maximum credible fire will not result in a shutdown of greater than six months. (See Concern FP.5-3)
- o There are no vital facilities for which three months would be considered to be an excessive shutdown period.
- o There are no facilities in the Tank Farm which, if damaged due to a credible fire, would result in an unacceptable shutdown of another DOE facility.

CONCERN: None.

FP.4 PROPERTY PROTECTION

PERFORMANCE OBJECTIVE: A credible fire should not result in an unacceptable property loss.

FINDINGS:

- The maximum credible fire loss, assuming the proper functioning of installed automatic fire protection systems, will not exceed $1 million for any facility in the Tank Farm. (See Concern FP.5-3)
- There are no facilities in the Tank Farm subject to fire loss which have replacement cost values which approach $25 million. The maximum credible property loss will not exceed $25 million, assuming the failure of a single fire protection system.
- The maximum property loss from a credible fire will not exceed $75 million, assuming failure of fire protection systems.

CONCERN: None.

FP.5 IMPROVED RISK

PERFORMANCE OBJECTIVE: The facility should qualify as an "improved risk" or "highly protected risk" as commonly defined by the property insurance associations specializing in such coverage.

FINDINGS:

- o The Tank Farm does not qualify as an "improved risk" or "highly protected risk" due to the lack of implementation of management fire loss prevention programs.

  * There is no single identified person within the Tank Farm Organization specifically designated as responsible for overall Tank Farm fire protection as would be required by industrial insurance organizations for rating of this facility as an "improved risk" or "highly protected risk".

  * The Tank Farm does not qualify as an "improved risk" or "highly protected risk" due to the failure to inspect fire protection control valves on a monthly basis. DOE guidelines and Orders, improved risk requirements, and Westinghouse Policy WHC-CM-4-3, Standard FS-2, "Fire Protection System Inspection and Testing" require monthly inspection and annual operation of fire protection valves.

  * There is no identifiable WHC implementing procedure for monthly inspection and annual operation of fire protection valves east of Bldg. 275-EA.

  * No documentation of monthly inspections or annual testing of fire protection valves east of Bldg. 275-EA is available.

  * The Tank Farm does not qualify as an "improved risk" or "highly protected risk" due to the failure to implement fire protection impairment control procedures through the use of fire protection impairment tags. Industrial Safety Manual, WHC-CM-4-3, FS-1 "Fire Protection System Impairment," provide a policy for control of fire protection system impairments. Water outages that affect fire protection systems are covered in "Water Outages," WHC-CM-4-3, FS-3. This standard, which requires the use of fire protection valve closure tags (Form BD-7200-214), is not being followed in the Tank Farm. Fire protection valves in Bldgs. 242A and 242S were found closed during this appraisal without the required fire protection valve closure tags attached.

* The non-emergency use of fire hydrants is not controlled in the Tank Farm in accordance with Industrial Safety Manual, WHC-CM-4-3, FP-6, "Non-emergency Use of Fire Hydrants". This standard requires that, during non-emergency use, the 4-1/2 inch hydrant outlet be provided with a quick-connect coupling for fire department emergency use. Hydrants at Bldgs. 242A and 242S were found being used without the required quick-connect fitting.

* Special Hazards Fire Protection Systems are not designed and installed in conformance with mandatory National Fire Protection Association (NFPA) standards. Water spray systems, provided as protection for the Condensate Tanks in Bldgs. 242A and 242S, do not conform with NFPA requirement No. 15 as follows:

  a) The use of 1/2 inch and 3/4 inch pipe is not allowed by the standard,
  b) The required hydraulic design of the system is not documented,
  c) Spray nozzles have been removed and replaced with plugs in some areas, and
  d) One nozzle is grossly misaligned.

CONCERN: (FP.5-1) (H1/C1) CAT.II

The Tank Farm does not qualify for an "improved risk" or "highly protected risk" rating as required by DOE 5480.7.

FINDINGS:

o The Tank Farm is included in the independent fire protection survey program provided under contract to EH Headquarters Office. A survey of the 200 East and 200 West Areas was completed by Factory Mutual Research Corporation in September 1986.

o A satisfactory corrective action plan exists to implement recommendations resulting from the independent survey program. The one recommendation relating specifically to the Tank Farm from the 1986 FMRC Survey (R86-30) was closed 2/4/87 with DOE-RL documented concurrence granted 1/31/89.

* The existing Engineering Design Review and Job Control System processes do not assure that all changes that may affect fire protection systems performance are reviewed by Fire Protection Engineering. Individuals with the responsibility of assigning Impact Levels which require safety review are not trained to recognize and identify whether the design or project requires Fire Protection Engineering review.

* Work or projects designated Impact Level 2 or higher require review by Nuclear Facilities Safety. There is no Nuclear Facilities Safety procedure which requires fire protection engineering review of designs or projects. Those individuals responsible for determining if Fire Protection Engineering review is required are not trained to recognize or identify whether the design or project may impact fire protection systems performance.

* Cognizant engineers (responsible for assigning Impact Levels) and Nuclear Facilities Safety Engineers (responsible for judging if Fire Protection Engineering review is required) are not trained in basic fire hazards, building construction, fire protection systems and DOE 5480.7.

* Fire Protection Engineering input was not utilized in the design review process for the Grout Treatment Facility (GTF) and the GTF fire protection systems.

CONCERN: (FP.5-2) (H2/C1) Existing measures are not adequate to assure that designs or projects which may impact fire protection systems performance are reviewed by Fire Protection Engineering as required by DOE 5480.7 10.b(1).

FINDINGS:

* The SAR (SD-WM-SAR-023) for Bldg. 242A dismisses, through qualitative analysis, explosions of organic solvents in the evaporator/condenser system as not being a credible accident. Organic solvents have been, and may continue to be, processed through the evaporator. There are no OSRs which relate to this potentially hazardous operation. A study of the potential for organic explosions in the evaporator, referenced in the SAR (Van Tuyl, 1983), states that problems related to an ignitable mixture in the evaporator could exist during start-up, shut-down or in the event of air in-leakage during operation. The risks associated with evaporator explosions under conditions when air may be present have not been analyzed. (See Concern TS.3-1)

CONCERN: (FP.5-3) (H2/C1) The hazards and risks associated with the ignition of organic solvents in the evaporator systems are not fully evaluated to assure that unsafe conditions are not created and that maximum downtime and maximum property loss due to fire do not exceed DOE 5480.7 limits.

FINDINGS:

* Contractor Fire Protection Survey Reports have been developed for all significant facilities in the Tank Farm, with the exception of the GTF which was constructed in 1988. The Fire Protection Survey Reports and SARs provide adequate evaluation of maximum downtime and maximum property losses associated with credible fire losses, except for evaporators in Bldgs. 242A and 242S.

* Contractor self-appraisals for fire protection of facilities are not conducted annually. A DOE Field Office Order (DOE-RL 5480.7, 7/2/84) requires annual appraisals for facilities valued greater than $25 million, biennial appraisals for facilities valued between $1 million and $25 million, and triennial appraisals for facilities valued between $250,000 and $1 million. The most recent appraisal of Bldg. 272 AW, with a replacement cost value of approximately $2 million, was completed in 1985.

CONCERN: (FP.5-4) (H3/C1)

Documented self-appraisals of facility fire protection are not conducted at the frequency required by DOE-RL 5480.7, 7/2/84.

FINDINGS:

o Cutting and welding operations are controlled by Industrial Safety Manual, WHC-CM-4-3, FP-9 and A-7, which require the use of Hazardous Work Permits (54-700-148). No cutting and welding observed during this appraisal was found to deviate from these standards.

o Fire loss records are properly maintained, analyzed, and reported. There were no reportable fire losses in CY 1988.

o The safe handling of flammable and combustible liquids is covered by WHC-CM-4-3, FP-13. No deviations from the requirements of this standard were noted during this appraisal.

o Portable fire extinguishers are properly available and marked.

o Fire fighters receive adequate basic fire fighter and emergency medical technician training. Additional special training is also provided, as appropriate.

* Pre-fire plans are available and are adequate for the types of occupancies. The fire department does not conduct drills in the use of the pre-fire plans in the facility. (See Concern ER.3-2)

CONCERN: (FP.5-5) (H2/C3) The Hanford Fire Department does not conduct response drills for fires in actual facilities.

FINDINGS:

- o Acceptance testing of fire protection systems after installation does include review by an individual with fire protection engineering expertise.
- o There are no boilers or special heating systems which require additional controls to prevent fires.
- o Adequate fire and supervisory alarm systems are provided for important facilities.
- * The required water demand for the water spray system for Bldg. 242A has not been documented. The combined water supply system (Raw Water System) provides an adequate water flow and pressure for all facilities in the Tank Farm when the Purex Plant is not operating. The adequacy of the water supply for Bldg. 242A, with the Purex Plant operating (Purex Plant water demand is 15,000 plus gallons per minute), could not be verified by the contractor.

CONCERN: (FP.5-6) (H2/C3) The adequacy of the Raw Water System to provide proper fire protection for Bldg. 242A, when the Purex Plant is operating has not been determined and documented.

IV. NOTEWORTHY PRACTICES

Noteworthy Practices are exceptionally good ways of accomplishing a Performance Objective or some aspect of it, and are worthy of emulation by other DOE facilities. Two Noteworthy Practices were identified, one in Training and Certification and one in Radiological Protection.

The Noteworthy Practices are identified on the following pages.

TC.7 TRAINING FACILITIES AND EQUIPMENT

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

NOTEWORTHY PRACTICE: WHC has procured a low-cost IBM PC XT-compatible concept simulator for use by nuclear/chemical operators in the 200 Area. This simulator provides operators with an opportunity to gain experience in understanding the operation of process equipment such as evaporators and heat exchangers. While this simulator is not suitable for plant-specific training for all 200 Area facilities, it does provide an excellent introduction to typical equipment to any trainee without process operations experience.

This simulator was developed by a vendor for the chemical and petroleum industries. While it has not yet been integrated into the initial training program for 200 Area Nuclear Process Operators, it has been evaluated by experienced operators and found to be an effective tool for learning.

RP.11 RADIOLOGICAL MONITORING/CONTAMINATION CONTROL

PERFORMANCE OBJECTIVE: The radiological monitoring and contamination control program should ensure worker protection from radiological exposures.

NOTEWORTHY PRACTICE: WHC has developed a program called "Scheduled Radiation Survey Program." This program is designed similar to a routine survey and tracking system. Each individual survey has a written task description. This task description includes: area of the site where the survey is to be conducted; building, and specific location; a description of the type of survey to be conducted including special instructions; special circumstances particular to the survey; specific instrumentation required to perform the survey; action levels which state maximum radiation and contamination levels which are permitted; and action to be taken if action levels are exceeded (including notifications, additional surveys, etc.). This program has made it possible for management to better manage and utilize Radiation Protection Technologists (RPT) resources. In addition, this program is unique in that, by its structure and detail, less experienced RPTs can be effectively utilized. Through the use of detailed survey descriptions, instrumentation needs and action levels, an effective, accurate, timely and compliance oriented survey program has resulted.

APPENDIX A

System for Classifying Concerns

A. Each concern contained in this report has been categorized for SERIOUSNESS by the following criteria:

CATEGORY I: Address a situation for which a clear and present danger exists to workers or members of the public. A concern in this category is to be immediately conveyed to the managers of the facility for action. At this point, consideration shall be given to whether a "clear and present danger" exists such that the facility shutdown authority of the Assistant Secretary (EH-1) should be exercised. If so, the Assistant Secretary or his designee is informed immediately.

CATEGORY II: Address a significant risk (but does not involve a situation for which a clear and present danger exists to workers or members of the public) or substantial non-compliance with DOE Orders. A concern in this category is to be conveyed to the manager of the facility no later than the appraisal closeout meetings for immediate attention. Category II concerns have a significance and urgency such that the necessary field response should not be delayed until the preparation of a final report and the routine development of an action plan. Any issues surrounding the concern or the suggested response should be addressed during the appraisal or immediately thereafter. Again, consideration should be given to whether facility shutdown is warranted under the circumstances.

CATEGORY III: Addresses significant non-compliance with DOE Orders, or suggests significant improvements in the margin of safety, but is not of sufficient urgency to require immediate attention.

B. Each concern made has also been characterized by the POTENTIAL HAZARD CONSIDERATIONS of the issues addressed or by the significance of its COMPLIANCE CONSIDERATIONS. Some concerns have been characterized in more than one of these groups when applicable. The criteria used are:

POTENTIAL HAZARD CONSIDERATIONS

Level 1. Has the potential for causing a severe injury or fatality, potentially fatal occupational illness, or loss of the facility.

Level 2. Has the potential for causing minor injury, minor occupational illness, major property damage, or has the potential for resulting in or contributing to unnecessary exposure to radiation or toxic substances.

Level 3. Has little potential for threatening safety, health, or property.

COMPLIANCE CONSIDERATIONS

Level 1. Does not comply with mandatory DOE requirements (DOE Orders), prescribed policies with mandatory DOE requirements (DOE Orders), prescribed policies and standards, and documented accepted practice (the latter is a professional judgment based on the acceptance and applicability of national consensus standards not prescribed by DOE requirements).

Level 2. Does not comply with recommended DOE references, standards, guidance, or with good practice (as derived from industry experience, but not based on national consensus standards).

Level 3. Has little or no compliance considerations; these concerns are based on professional judgment in pursuit of excellence in design or practice (i.e., these are improvements for their own sake -- not deficiency-driven).

APPENDIX B

Classification and Tabulation of Concerns

Using the criteria in Appendix A, the majority of the Concerns have been categorized as Category III for seriousness. Three Concerns were identified as Category II issues, requiring prompt management attention. The Concerns were also characterized by potential risk and compliance considerations. Attachment B-1 of this Appendix summarizes the results of the characterizations.

All of the Concerns are tabulated in Attachment B-2 of this Appendix without their supporting bases. The user is cautioned that to fully understand any Concern, it is necessary to read its basis in Section II.

ATTACHMENT B-1.

Classification of Concerns

Concern Number	Potential Hazard Level	Compliance Level
OA.1-1	2	2
OA.4-1	3	2
OA.5-1	2	1
OA.6-1	3	1
OP.1-1	2	2
OP.2-1	1	1
OP.2-2	1	2
MA.2-1	2	2
MA.3-1	2	2
MA.3-2	2	2
MA.5-1	2	2
MA.7-1	1	2
TC.1-1	3	2
TC.1-2	2	2
TC.1-3	2	2
TC.3-1	1	1
TC.3-2	2	1
TC.5-1	2	2
TC.7-1	2	2
TC.8-1	2	2
AX.1-1	2	2
AX.1-2	3	2
AX.1-3	3	2
AX.2-1	2	2
AX.2-2	3	1
AX.4-1	3	2
AX.4-2	2	1
AX.5-1	2	1
AX.5-2	3	2
ER.1-1	2	1
ER.2-1	2	2
ER.2-2	2	2
ER.3-1	3	2
ER.3-2	2	2
ER.3-3	2	3
ER.3-4	2	2
ER.4-1	2	3
ER.4-2	2	3

*This concern is a Category II. All other concerns are Category III.

ATTACHMENT B-1 (cont'd)

Concern Number	Potential Hazard Level	Compliance Level
TS.1-1	2	3
TS.2-1	2	3
TS.3-1	2	1
TS.6-1	3	2
*TS.7-1	2	1
*TS.7-2	2	1
TS.7-3	3	1
FR.3-1	2	3
FR.3-2	2	3
RP.1-1	3	2
RP.1-2	2	2
RP.3-1	2	1
RP.5-1	2	1
RP.6-1	2	2
RP.8-1	2	2
RP.10-1	2	1
RP.11-1	2	2
RP.11-2	2	2
RP.12-1	2	2
RP.12-2	2	2
PP.2-1	2	2
PP.4-1	2	2
PP.5-1	2	1
FP.1-1	1	1
*FP.5-1	1	1
FP.5-2	2	1
FP.5-3	2	1
FP.5-4	3	1
FP.5-5	2	3
FP.5-6	2	3

*This concern is a Category II. All other concerns are Category III.

ATTACHMENT B-2

Tabulation of Concerns

A. ORGANIZATION AND ADMINISTRATION

CONCERN: (OA.1-1) (H2/C2) Management has not assured the timely updating of operating procedures to comply with DOE and WHC standards.

CONCERN: (OA.4-1) (H3/C2) Because of the low frequency of independent quality assurance audits, and the narrow scope of line and quality inspections and surveillances at the Tank Farm, WHC management is neglecting a useful source of information to enhance the quality and safety of the Tank Farm operations.

CONCERN: (OA.5-1) (H2/C1) Management has not been effective in assuring that all positions are being staffed by trained and qualified personnel.

CONCERN: (OA.6-1) (H3/C1) Records management is not in compliance with the requirement of DOE-RL 1324.1A, DOE 1324.2A and WHC-CM-3.5.

B. OPERATIONS

CONCERN: (OP.1-1) (H2/C2) The amount of time required by Shift Managers and Plant Engineers to administer the Job Control System negatively impacts the performance of their assigned duties. (See Concern OA.5-1)

CONCERN: (OP.2-1) (H1/C1) The current OSRs do not meet the requirements for OSRs given in DOE 5480.5 or in accepted nuclear industry practice. (See Concerns OA.1-1 and TS.3-1)

CONCERN: (OP.2-2) (H1/C2) Present inconsistencies in incorporating OSR information into procedures could create errors or misunderstanding when applied by Operations Staff.

C. MAINTENANCE

CONCERN: (MA.2-1) (H2/C2) Inaccurate readings from the exhauster stack monitors, liquid level monitors and radiation level monitors, as well as erroneous alarms, may occur as a result of weather conditions.

CONCERN: (MA 3-1) (H2/C2) Equipment performance cannot be assured due to inadequacies in procedural controls and manpower for maintenance and calibration activities.

CONCERN: (MA.3-2) (H2/C2) Proper and updated requirements for instrumentation and equipment are not provided by the cognizant engineer.

CONCERN: (MA.5-1) (H2/C2) Quality-controlled items are not properly segregated and stored at the Tank Farm shops.

CONCERN: (MA 7-1) (H1/C2) There is a lack of control of procedures, documentation and reference materials for maintenance activities in the Tank Farm.

D. TRAINING AND CERTIFICATION

CONCERN: (TC.1-1) (H3/C2) Documentation of the content of personnel safety and certification/recertification training, and associated examinations, is not being maintained as a lifetime record.

CONCERN: (TC.1-2) (H2/C2) Technical training programs are not being evaluated as required by applicable WHC procedures.

CONCERN: (TC.1-3) (H2/C2) There are no WHC top-level policies or procedures establishing requirements for technical training programs that are not the responsibility of the Technical Training Organization.

CONCERN: (TC.3-1) (H1/C1) Shift Manager and Shift Support Supervisor positions are routinely being staffed by personnel who are not formally certified.

CONCERN: (TC.3-2) (H2/C1) There is no formal retraining program for Tank Farm operators or supervisors.

CONCERN: (TC.5-1) (H2/C2) Maintenance personnel have not received formal training in some equipment/systems specific to the Tank Farm.

CONCERN: (TC.7-1) (H2/C2) There is no established mechanism for identifying needed changes in Tank Farm training materials based on equipment modifications or procedure changes.

CONCERN: (TC.8-1) (H2/C2) Quality Control Inspector initial and continuing training do not support job needs with respect to Tank Farm specific training.

E. AUXILIARY SYSTEMS

CONCERN: (AX.1-1) (H2/C2) The Computer Automated Surveillance System used in control and monitoring of Tank Farm operations is not under configuration control in accordance with Standard Engineering Practices, WHC-CM-6-1, Procedure EP 2.1, "Configuration Control".

CONCERN: (AX.1-2) (H3/C2) Within 200/600 Environmental Protection Section, there is a lack of administrative and management control over the process by which the amount of radioactive material released to the environment is calculated and reported to DOE.

CONCERN: (AX.1-3) (H3/C2) Goals for the Tank Farm, based upon past results and anticipated operations, have not been established to reduce the total quantities of hazardous substances discharged to the environment.

CONCERN: (AX.2-1) (H2/C2) Management and supervision are not ensuring that duties prescribed by procedures and regulations are being accomplished when key personnel are lost from the organization.

CONCERN: (AX.2-2) (H3/C1) Facility-specific hazardous waste minimization plans and annual goals have not been established for the Tank Farm and the Laundry, as required by DOE 5820.2A and DOE 5480.1B.

CONCERN: (AX.4-1) (H3/C2) On-the-job training of Air Balance Power Operators is not being accomplished in accordance with ANSI-N45.2.6 (superceded by ANSI NQA-1 and ANSI NQA-2).

CONCERN: (AX.4-2) (H2/C1) The design and testing of ventilation systems does not meet the requirements of ANSI-N13.1-1969, ANSI-N-13.10-1974 and DOE 5480.4.

CONCERN: (AX.5-1) (H2/C1) The Tank Farm emergency electrical power systems are not tested in accordance with DOE-5480.4, which invokes IEEE 338-1977, Section 6 and IEEE 308-1980, Section 7.

CONCERN: (AX.5-2) (H3/C2) Tests of vital equipment have not been performed in accordance with the OSR designated Preventative Maintenance procedure 2E0745, "Operatibility/Load Test of Diesel Generators 244-AR, 241-A and 242-A."

F. EMERGENCY READINESS

CONCERN: (ER.1-1) (H2/C1) The WHC emergency response capabilities for non-radiological material incidents in the Tank Farm areas have not been adequately planned or demonstrated, as required by DOE Orders.

CONCERN: (ER.2-1) (H2/C2) The personnel notification lists in the Tank Farm emergency plans are not current and do not contain alternate means of contacting key emergency personnel.

CONCERN: (ER.2-2) (H2/C2) The document control system does not provide positive assurances that controlled copies of the "Site Emergency Plan" are current.

CONCERN: (ER.3-1) (H3/C2) Combining controller/evaluator and controller/participant responsibilities can obscure emergency response deficiencies during exercises.

CONCERN: (ER.3-2) (H2/C2) Integrated exercises involving the Tank Farm have not been conducted on a regular basis.

CONCERN: (ER.3-3) (H2/C3) Emergency bus drivers for evacuation do not receive periodic training.

CONCERN: (ER.3-4) (H2/C2) Some key personnel have not received the necessary training prior to being assigned responsibility for emergency response functions.

CONCERN: (ER.4-1) (H2/C3) Limitations on communication capabilities between Tank Farm operators and Shift Managers could greatly increase the consequences of an accident.

CONCERN: (ER.4-2) (H2/C3) Emergency kits are not universally available and their location and contents are not known to the Tank Farm Operations personnel initially responding to an emergency.

G. TECHNICAL SUPPORT

CONCERN: (TS.1-1) (H2/C3) Inexperienced cognizant engineers are not being trained or certified quickly enough to meet workload requirements.

CONCERN: (TS.2-1) (H2/C3) Actions to complete some safety-related activities and procedures listed in the Tank Farm "Quality Improvement Program" are prioritized for routine completion but should be completed sooner.

CONCERN: (TS.3-1) (H2/C1) Tank Farm SARs do not comply with DOE 5481.1B "Safety Analysis and Review System" and DOE 5480.5 "Nuclear Facility Safety."

CONCERN: (TS.6-1) (H3/C2) Radiation monitoring systems are not in compliance with the requirements established by Environmental Compliance, WHC-CM-7-5.

CONCERN: (TS.7-1) (H2/C1) CAT. II The packaging and transportation of radioactive liquid waste from the 300 Area to the Tank Farm is not in compliance with RL 5480.1, Chap III, Hazardous Material Packaging and Shipping, WHC-CM-2-14, or the specific requirements of the Safety Analysis Report for Packaging, SD-RE-SAP-013. (See Performance Objective AX.3).

CONCERN: (TS.7-2) (H2/C1) CAT. II The shipment of sodium hydroxide to 204 AR does not meet the safety requirements of RL 5480.1, Chap III, or Hazardous Materials Packaging and Shipping, WHC-CM-2-14.

CONCERN: (TS.7-3) (H3/C1) The WHC Packaging and Transportation Training Program does not meet all the requirements of DOE 5480.3, RL 5480.1, Chap. III, or Hazardous Materials Packaging and Shipping, WHC-CM-2-14.

J. FACILITY SAFETY REVIEW

CONCERN: (FR.3-1) (H2/C3) The possibility exists that projects with safety significance will not receive an adequate independent review if the project is assigned lower than appropriate Impact Levels.

CONCERN: (FR.3-2) (H2/C3) The Defense Waste Storage Safety Group is not adequately pro-active in searching out safety issues through visits to facilities and routine interaction with Tank Farm personnel.

L. RADIOLOGICAL PROTECTION

CONCERN: (RP.1-1) (H3/C2) Supervisors are unnecessarily restricted from performing independent assessment of subordinate's performance or proper pre-planning of work in contaminated areas because of the requirement to be accompanied and surveyed by an RPT.

CONCERN: (RP.1-2) (H2/C2) Radiological problems are not being tracked or trended.

CONCERN: (RP.3-1) (H2/C1) WHC manuals and procedures have not been revised to reflect the requirements of DOE 5480.11.

CONCERN: (RP.5-1) (H2/C1) Existing procedural criteria do not enable the Radiation Protection Technologist to assess radiation exposure levels that warrant the use of a beta photon dosimeter.

CONCERN: (RP.6-1) (H2/C2) Trending of air sample results to detect low-level radioactive buildup is not performed.

CONCERN: (RP.8-1) (H2/C2) WHC requirements for determination of background radiation limits for air filter sample systems are not being followed.

CONCERN: (RP.10-1) (H2/C1) The air monitoring program has not been implemented in accordance with the criteria established by WHC.

CONCERN: (RP.11-1) (H2/C2) A plan and schedule to expedite the installation of portal contamination monitors at the Tank Farm has not been developed.

CONCERN: (RP.11-2) (H2/C2) Supervisory reviews of radiation surveys are not being performed.

CONCERN: (RP.12-1) (H2/C2) The ALARA Program in the Tank Farm area has not been fully implemented in accordance with WHC policy.

CONCERN: (RP.12-2) (H2/C2) Tracking and trending of data associated with long-term radiation work permits is not being done.

M. PERSONNEL PROTECTION

CONCERN: (PP.2-1) (H2/C2) The limited availability of non-radiological chemical characterization of waste tank contents adversely impacts the reliability of reviews of potential hazards, accurate identification of necessary controls, and emergency response actions associated with Tank Farm activities.

CONCERN: (PP.4-1) (H2/C2) Trained personnel resources are inadequate to meet the hazard identification, emergency response, and routine surveillance (monitoring) requirements necessary to fully implement the Personnel Protection Program.

CONCERN: (PP.5-1) (H2/C1) WHC has not implemented a periodic monitoring program, as required by DOE 5480.10, to assure the continued effectiveness of controls for physical and chemical stresses.

N. FIRE PROTECTION

CONCERN: (FP.1-1) (H1/C1) The fire exits from the Condenser Rooms in Bldgs. 242A and 242S do not conform to National Fire Protection Association Life Safety Code, No. 101-1988

CONCERN: (FP.5-1) (H1/C1) CAT. II The Tank Farm does not qualify for an "improved risk" or "highly protected risk" rating as required by DOE 5480.7.

CONCERN: (FP.5-2) (H2/C1) Existing measures are not adequate to assure that designs or projects which may impact fire protection systems performance are reviewed by Fire Protection Engineering as required by DOE 5480.7 10.b(1).

CONCERN: (FP.5-3) (H2/C1) The hazards and risks associated with the ignition of organic solvents in the evaporator systems are not fully evaluated to assure that unsafe conditions are not created and that maximum downtime and maximum property loss due to fire do not exceed DOE 5480.7 limits.

CONCERN: (FP.5-4) (H3/C1) Documented self-appraisals of facility fire protection are not conducted at the frequency required by DOE-RL 5480.7, 7/2/84.

CONCERN: (FP.5-5) (H2/C3) The Hanford Fire Department does not conduct response drills for fires in actual facilities.

CONCERN: (FP.5-6) (H2/C3) The adequacy of the Raw Water System to provide proper fire protection for Building 242A, when the Purex Plant is operating has not been determined and documented.

APPENDIX C

Team Composition and Areas of Responsibility

Technical Safety Appraisal
Hanford Tank Farm Facility

EH Senior Manager	James P. Knight, Director Office of Safety Appraisals Department of Energy
Team Leader	Lorin C. Brinkerhoff Office of Safety Appraisals Department of Energy
Assistant Team Leader	Steve K. Singal Office of Safety Appraisals Department of Energy
Appraisal Coordinators	Mary Meadows Office of Safety Appraisals Department of Energy
	Barbara K. Bowers Office of Safety Appraisals Department of Energy
	Patricia Davidson Oak Ridge Associated Universities
Liaison with the Team	S. K. Moy Richland Operations Office Department of Energy
	J. E. Newson Richland Operations Office Department of Energy
Technical Editor	John W. Klingelhoefer Battelle Columbus Operations
Organization & Administration and Security/Safety Interface	Frank J. Arsenault SCIENTECH, INC.
Operations	William J. Zielenbach Battelle-Columbus Operations

Maintenance	Harry W. Heiselmann SCIENTECH, INC.
Training & Certification	Thomas J. Mazour Private Consultant
Auxiliary Systems	Thomas L. Van Witbeck SCIENTECH, INC.
Emergency Readiness and Facility Safety Review	Robert W. Tayloe, Jr. Battelle-Columbus Operations
Technical Support	Lewis S. Masson SCIENTECH, INC.
Technical Support/Packaging & Transportation	John M. Cece Menehune Marine Services, LTD.
Radiological Protection	Wilbert G. Zurliene General Dynamics Services Co. Reactor Plant Services
Personnel Protection	Robert D. Gilmore Environmental Health Sciences, Inc.
Fire Protection	Wayne D. Holmes Professional Loss Control, Inc.
Quality Assurance/Organization & Administration	Leonard M. Lojek Office of Quality Programs Department of Energy
Quality Assurance/Technical Support	Henry P. Himpler, Jr. ARINC Research Corp.

APPENDIX D

Biographical Sketches of Team Members

Technical Safety Appraisal
Hanford Tank Farm Facility

NAME: Lorin C. Brinkerhoff (Team Leader)

ASSOCIATION: DOE/Headquarters - Technical Safety Appraisal Team Leader, Office of Safety Appraisals

EXPERIENCE: 36 years

- Acting Reactor Safety Branch Chief
- Reactor Safety Specialist - AEC/ERDA/DOE
- Senior Nuclear Engineer - Aerojet General Corp - Nerva Program, Nuclear Rocket Development Station (NRDS), Nevada
- Manager, Nuclear Critical Facility, Lawrence Livermore National Laboratory
- Reactor Foreman - Phillips Petroleum Co., Idaho Test Site
- Graphite Research Analyst - General Electric Co. - Hanford Test Site

EDUCATION: B.S., Chemical Engineering - University of Utah

OTHER: Member, ANS-15 Standards Committee on Research Reactor Safety 1980
Member, ANSI N-16 Standards Committee on Nuclear Criticality Safety (1978-1984)

Listed in:

Who's Who in the East

Who's Who in the World

NAME: Steve K. Singal (Assistant Team Leader)

ASSOCIATION: DOE Headquarters, Office of Safety Appraisals

EXPERIENCE: 19 years

- Nuclear Engineer, assigned as an Assistant Team Leader in Safety Inspection Division (EH-331).
- General Engineer and HQ Study Plan Coordinator for the characterization of the Yucca Mountain Deep Geologic Repository (RW-332).
- Project Manager responsible for review of license applications for hydroelectric power projects (FERC).
- Environmental Engineer responsible for preparation of EIS for coal-conversion of NYC's Arthur Kill and Ravenswood Powerplants (DOE's Office of Fuels Conversion).
- Environmental Engineer of State of Maryland responsible for enforcement of air, water, solid waste, and noise pollution control laws.

EDUCATION: M.S., Civil Engineering, Brigham Young University
B.S., Civil Engineering, Roorkee University, India

OTHER: Registered Professional Engineer (Maryland)

NAME: Frank J. Arsenault (Organization & Administration and Security/Safety Interface)

ASSOCIATION: SCIENTECH, INC.

EXPERIENCE: 30 years

- o SCIENTECH, INC
  - Regulatory Analyst: Nuclear Power Plant Safety
- o Participated in TSA for the Mound Facility and Design Reviews at: Savannah River Production Reactors and Oak Ridge HFIR.
- o U.S. Nuclear Regulatory Commission
  - Manager: Nuclear Regulatory Research
- o U.S. Atomic Energy Commission
  - Policy Analyst: Safeguards & Security

EDUCATION B.S., Physics, University of Massachusetts

NAME: John M. Cece (Technical Support/Packaging & Transportation)

ASSOCIATION: President - Menehune Marine Services, LTD.

EXPERIENCE: 26 years

- Technical Safety Appraisal Experience: FMPC, Plutonium Finishing Plant, PUREX, the Hot Fuel Examination Facility, H-B Canyon, Y-12, Rocky Flats.
- Member, peer review of Rocky Flats Safety Analysis Report.
- Safety Consultant: Hazardous Materials Packaging and Transportation. Accomplishments include: safety reviews of 36 inch pipeline for Travis County (Texas) and chemical manufacturing plant (Connecticut); Technical advisor to DOE and the Santa Fe Railroad for development for hazardous materials training film.
- U.S. Department of Energy, Headquarters - Manager, Hazardous Materials Packaging and Transportation, Office of Operational Safety, includes functional appraisals at: AL, OR, CH, SAN, RL, NV, SR, LANL.
- U.S. Department of Transportation (Coast Guard)

EDUCATION: Ph.D., Physical Chemistry, University of Rhode Island
B.S., Engineering, U.S. Coast Guard Academy

NAME: Robert D. Gilmore (Personnel Protection)

ASSOCIATION: Environmental Health Sciences, Inc. (EHS)

EXPERIENCE: 15 years

- o Participated in TSAs for the FMPC, Y-12, Pantex, LLNL, SNL, ATR, and RFP.
- o President, EHS
  - Engineering and technical services firm specializing in environmental and safety sciences
- o Hanford Environmental Health Foundation
  - Director of Operations and Planning: providing comprehensive occupational and environmental health services including programs in occupational medicine, nursing, psychology, research, and environmental sciences.
  - Department Manager for industrial hygiene services, environmental monitoring, and analytical chemistry.
- o Union Carbide Corporation
  - Corporate Headquarters Staff providing technical direction and program guidance to multi-national operating components in health, safety, and environmental affairs
  - Manager of Industrial Hygiene Department: Oak Ridge Gaseous Diffusion Plant
- o U.S. Atomic Energy Commission/U.S. ERDA
  - Safety and Industrial Hygiene Engineer; Richland Operations Office

EDUCATION: M.S., Industrial Hygiene, University of Washington
B.S., Environmental Health, Chemistry; University of Washington

OTHER Certified in Comprehensive Practice of Industrial Hygiene by the American Board of Industrial Hygiene

NAME: Harry W. Heiselmann (Maintenance)

ASSOCIATION: SCIENTECH, INC., Idaho Falls, Idaho
Senior Associate

EXPERIENCE: 30 years

- o Nuclear Safety Programs
  - Testing and Equipment Maintenance
  - Design and Fabrication
- o DOE Energy Conservation
  - Electric Vehicle Program
- o Industrial and Commercial
  - Product Research and Development

EDUCATION: B.S., Mechanical Engineering, Illinois Institute of Technology
University of Idaho Graduate Courses
Jet Propulsion Lab/U.S. Army Guided Missile School

OTHER: Member, American Society Mechanical Engineers/Idaho Section Officer
Registered Professional Engineer
Member, American Nuclear Society

NAME: Henry P. Himpler, Jr. (Quality Assurance/Technical Support)

ASSOCIATION: ARINC Research Corporation

EXPERIENCE: 33 years

- Participated in TSA for the Plutonium Finishing Plant
- Test and Evaluation Systems Engineering, Management and Design - Westinghouse Corp. and Raytheon Co.
- Quality Assurance Project Engineer and Project Management Westinghouse and General Electric Co.
- Consultant to DOE in QA Program Planning and Auditing - ARINC Research Corporation
- Consultant to U.S. Navy Weapon Systems/Project Management, Planning and Auditing - ARINC Research Corporation
- Electronic Systems Design Engineering - Westinghouse Corp.

EDUCATION: B.S., Electrical Engineering, John Hopkins University
B.S., Industrial Technology, Roger Williams College

NAME: Wayne D. Holmes, (Fire Protection)

ASSOCIATION: Professional Loss Control, Inc.

EXPERIENCE: 16 years

- o Professional Loss Control, Inc., Oak Ridge, TN
  - Senior Engineer: Fire protection inspection, audit, and appraisal of nuclear power, production, research and other industrial facilities.
- o American Nuclear Insurers, Farmington, CT
  - Director, Technical Review: Manager of domestic fire protection engineering support staff and engineering coordinator for engineering risk assessment of foreign reactors.
- o Northeast Utilities, Hartford, CT
  - Corporate Fire Protection Specialist: Responsible for system-wide fire protection policies.
- o Industrial Risk Insurers, Boston, MA
  - District Supervising Engineer: Manager of fire protection staff for insurer of highly protected commercial and industrial facilities.

EDUCATION: M.S., Fire Protection Engineering, Worcester Polytechnic Institute
B.S., Mechanical Engineering, Worcester Polytechnic Institute

OTHER: Member, Society of Fire Protection Engineers (SFPE) and SFPE Research Committee
Member, National Fire Protection Association and Secretary, NFPA Committee on Atomic Energy
Member, ASTM Committee on Fire Standards Licensed Professional Engineer, Connecticut

NAME: John W. Klingelhoefer (Technical Editor)

ASSOCIATION: Battelle - Columbus Operations

EXPERIENCE: 17 years

- o Battelle Columbus Division
  - Project Manager: Security Inspection and Evaluations for U.S. DOE weapons production facilities.
  - Nuclear fuel cycle safety and security studies for U.S. Nuclear Regulatory Commission fuel production facility protection and protection of spent fuel and high level waste in transit.
- o Washington Public Power Supply System
  - Manager Safeguards: safety and security systems design and integration, emergency preparedness planning and safeguards contingency planning.
  - Responsible for personnel, administrative and physical protection of commercial nuclear reactors.
- o NUSAC, Inc.
  - Senior Technical Associate: developed design criteria and specifications for integrating safeguards and security systems for DOE and NRC facilities.
- o U.S. Army
  - Captain, Field Artillery. Commanded nuclear weapons detachment. Responsible for all nuclear safety, safety and security requirements.

EDUCATION: B.S. Engineering, U.S. Military Academy

OTHER: Certified Protection Professional, American Society for Industrial Security, Member IEEE Subcommittee on Physical Security

NAME: Leonard M. Lojek (Quality Assurance/Organization & Administration)

ASSOCIATION: DOE/Headquarters, Office of Quality Programs

EXPERIENCE: 28 years

- Participated in TSA of the Plutonium Finishing Plant.
- Quality Assurance Engineer, Assistant Secretary of Environment, Safety, and Health, DOE.
- Quality Assurance Program Manager, Assistant Secretary of Fossil Energy, DOE.
- Program Manager of R&D Efforts in Solvent Refined Coal Conversion Programs (SRC-I and SRC-II), Assistant Secretary of Fossil Energy, DOE.
- Project Manager and Project Engineer for Disposal of Obsolete Toxic Chemical Munitions, Chemical Systems Laboratory, DOD.
- Product Engineer for Smoke and Pyrotechnic Chemicals, and Riot Control Chemicals. Process Engineer for Plasticized White Phosphorus Munitions, Chemical Systems Laboratory, DOD.
- Technical Services Engineer for Industrial and Utility Water Treatment Systems, Calgon Corporation.

EDUCATION: M.S.A., Management Engineering, George Washington University
B.S., Chemical Engineering, Carnegie-Mellon University

OTHER: Member
- American Institute of Chemical Engineers
- American Society for Quality Control
- American Defense Preparedness Association

NAME: Lewis S. Masson (Technical Support)

ASSOCIATION: SCIENTECH, INC.

EXPERIENCE: 34 years

- o SCIENTECH, INC.
  - Senior Associate: provides technical assistance to U.S. DOE and U.S. Nuclear Regulatory Commission in the fields of mechanical and nuclear engineering.
- o EG&G Idaho, Inc.
  - Technical support to Office of Defense Energy Projects.
  - Program Manager for the Fusion Engineering Program.
  - Division Manager for the Loss-of-Fluids (LOFT) Engineering Support Division.
- o Aerojet Nuclear Company
  - Design Engineering Manager, Special Reactor Projects.
- o General Electric Company
  - Manager, engineering activities for advanced nuclear propulsion systems.
  - Project engineer during recovery of the damaged SL-1 reactor at INEL.
  - Manager of test facilities and activities for Aircraft Nuclear Propulsion Program.

EDUCATION: M.S. Nuclear Engineering, University of Idaho
B.S. Mechanical Engineering, University of California, Berkeley

OTHER: Member of America Nuclear Society and Fusion Energy Division Executive Committee

NAME: Thomas J. Mazour (Training & Certification)

ASSOCIATION: Private Consultant

EXPERIENCE: 18 years

- o Private Consultant
  - Participated in 13 Technical Safety Appraisals.
  - Developed and presented training program for DOE site-surveillance personnel.
  - Supported development of reactor training programs to meet DOE Training Accreditation Program.
  - Evaluated operations organization and administration and training areas for NRC inspections of commercial nuclear power plants.
- o Analysis & Technology, Inc.
  - Supported the NRC in evaluating utility training programs and developing training review criteria and regulations
  - Supported INPO development of a performance-based training accreditation program.
- o Burns & Roe, Inc.
  - Design engineer and licensing engineer
- o U.S. Navy - Nuclear training officer, nuclear reactor operations, nuclear weapons officer

EDUCATION: Sc.D (candidate) Management Systems, University of New Haven
M.S., Industrial Engineering, University of New Haven
M.B.A., University of New Haven
B.S., Mathematics, U.S. Naval Academy

OTHER: Registered Professional Engineer (Nuclear/Mechanical)
Adjunct faculty member, University of New Haven industrial engineering and operations research courses.

NAME: Robert W. Tayloe, Jr. (Emergency Readiness and Facility Safety Review)

ASSOCIATION: Battelle-Columbus Operations

EXPERIENCE: 10 years

- Battelle Columbus Division, Research Scientist
  - Criticality Safety and Training
  - Radiation Shielding
  - Dosimetry
  - Participant, Security Inspections and Evaluation of DOE Facilities
  - Participated in four previous Technical Safety Appraisals of DOE Facilities
- Portsmouth Gaseous Diffusion Plant, Nuclear Criticality Safety Staff
  - Member of Nuclear Safety Committees
  - Conducted audits, training, analysis, interface with operations and engineering, instrumentation and resolution of inventory differences
  - Developed Emergency Drills, participated in Emergency Management Exercises, Member of Emergency Preparedness Committee

EDUCATION: Completed course work towards M.S., Nuclear Engineering, at Ohio State University
B.S., Nuclear Engineering, North Carolina State University

OTHER: Lectured on "Safety in Handling UF_6" 1983-1985 for DOE Office of Nuclear Safety Seminar on Prevention of Significant Nuclear Events. Professional Engineer, State of Ohio.

NAME: Thomas L. Van Witbeck (Auxiliary Systems)

ASSOCIATION: SCIENTECH, INC.

EXPERIENCE: 20 years

- o SCIENTECH, INC.
  - Manages nuclear utility litigation support.
- o PLD Energy Services
  - Vice President: supported nuclear plant operations
- o Energy Incorporated
  - Vice President: provided maintenance management systems, plant operations, and quality assurance services.
  - Director: management and quality assurance audits and technical support.
  - Group Manager: onsite team to assess the Three-Mile Island accident
  - Principal Consultant - technical support of commercial reactors and DOE
- o Westinghouse Electric Corporation
  - Shift Supervisor/Supervisory Engineer
- o Oregon State University
  - Reactor operator and health physicist
- o U.S. Navy
  - Petty Officer in charge of water chemistry and radiological programs

EDUCATION: B.S. Nuclear Engineering, Oregon State University
U.S. Navy Engineering Laboratory Technician School
U.S. Navy Nuclear Power School

OTHER: Member, American Nuclear Society
Registered Professional Engineer
Licensed Reactor Operator (OP-2315)
Startup Level III per ANSI N45.2.6

NAME: William J. Zielenbach (Operations)

ASSOCIATION: Battelle-Columbus Operations, D&D Operations Group

EXPERIENCE: 33 years

- o Battelle Columbus Division
  - Quality Assurance Manager: D&D of Battelle Columbus Nuclear Material Facilities.
  - Staff Scientist: Security Evaluations (3) and Technical Safety Appraisals (7) of DOE facilities; nuclear package QA.
  - Project Manager: Nuclear fuel cycle studies and facility safety analysis.
  - Project Leader and Member: Design and licensing of nuclear fuel shipping casks.
  - Project Leader and Member: Various programs for design and operation of irradiation experiments for Materials Testing Reactor, Engineering Test Reactor, Battelle Research Reactor, Experimental Breeder Reactor-II, University of Michigan Reactor (fueled and nonfueled).
  - Researcher: Development of high-temperature air frame bearings and seals, and naval bearings. Materials development for Aircraft Nuclear Propulsion program.

EDUCATION: M.S., Nuclear Engineering, Ohio State University
B.S., Chemical Engineering, University of Pennsylvania

NAME: Wilbert G. Zurliene (Radiological Protection)

ASSOCIATION: General Dynamics Services Company

EXPERIENCE: 25 years

- o Reactor Plant Services, Engineering Supervisor
  - Evaluation of Radiation Protection Program at Power Reactors and DOE facilities
  - Establishment of Radiological Engineering function at Power Reactors and DOE facilities including interim management
  - Respiratory Protection
- o General Dynamics/Electric Boat Division, Radiological Controls Staff
  - Radiological Engineering including design review and operations support
  - Management of Operational Radiological Control
- o U.S. Navy
  - Naval Nuclear Power Program

EDUCATION: B.S., Business Administration, University of Rhode Island

OTHER: Member, American Nuclear Society and ANS 6/5.6.2, Radiation Protection Design Criteria for Post Accident Health Physics Facilities and Access Control
Invited Faculty for "Proceedings of the Health Physics Society 1981 Summer School on selected TOPICS in Reactor Health Physics," NUREG/CP-0039 at University of Kentucky.
NAS/ENS International Conference 1988, TMI-2 "Radiological Conditions and Experiences in the Auxiliary Building," Presentation