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Page 1 of 3401
1. EDT 605956

2. To: (Receiving Organization) Distribution		3. From: (Originating Organization) TWRs Project Safety Engineering		4. Related EDT No.: N/A	
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4,1	1	Cog. Eng. J. C. Lavender		6/3/94	B5-37						
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4,1	1	QA A. J. Fisher		8/31/94	A4-79D						
4,1	1	Safety L. L. Reed		8/31/94	R3-09						
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18. J. C. Lavender Signature of EDT Originator Date 6/3/94		19. Donna M. Busche Authorized Representative Date 9/6/94 for Receiving Organization		20. Larry E. Johnson Cognizant/Project Engineer's Manager Date 6/3/94		21. DOE APPROVAL (if required) Ltr. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
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Document Number: WHC-SD-GN-ISB-30001, REV. 0

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SUPPORTING DOCUMENT		1. Total Pages 390
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7. Abstract <div style="text-align: center;"> APPROVED FOR PUBLIC RELEASE <i>9/9/94 Y. Solie</i> </div> <p>The purpose of this document is to identify WHC programs and requirements that are an integral part of the authorization basis for nuclear facilities that are generic to all WHC-managed facilities. The purpose of these programs is to implement the DOE Orders, as WHC becomes contractually obligated to implement them. The Hanford Generic ISB focuses on the institutional controls and safety requirements identified in DOE Order 5480.23, <i>Nuclear Safety Analysis Reports</i>.</p>		
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HANFORD GENERIC INTERIM SAFETY BASIS

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HANFORD GENERIC INTERIM SAFETY BASIS

1.0 INTRODUCTION

During Fiscal Year 1992, the U.S. Department of Energy, Richland Operations Office (RL) separately transmitted the following U.S. Department of Energy (DOE) Orders to Westinghouse Hanford Company (WHC) for compliance:

- DOE 5480.21, *Unreviewed Safety Questions*
- DOE 5480.22, *Technical Safety Requirements*
- DOE 5480.23, *Nuclear Safety Analysis Reports*

The WHC developed a strategy calling for an integrated implementation of these three orders. The strategy had the following three primary objectives:

- Obtain DOE approval of a single list of DOE-owned and WHC-managed nuclear facilities
- Establish and/or upgrade the "Safety Basis" for each nuclear facility
- Establish a functional unreviewed safety question (USQ) process to govern the management and preservation of the safety basis for each nuclear facility.

The WHC implementation plan transmitted to RL on October 28, 1992 detailed the WHC-managed nuclear facilities, existing safety basis documents for each facility, and a plan to document the basis for interim operation or restrictions on interim operations. The implementation plan further outlined the tasks and resources required for each facility to upgrade their USQ program to meet the new DOE order requirements.

The WHC prepared a procedure and specified the standard format and content requirements for documenting the current basis for interim operations in WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*, Chapter 8.0, "Interim Safety Basis." The chapter defines the requirements for the establishment of an interim safety basis (ISB) for WHC-managed nonreactor nuclear facilities. A documented safety basis provides the information relating to the control of hazards at a facility (including design, engineering analyses, and administrative controls) upon which it can be concluded that current activities can be conducted safely. "Activities," as used here, encompass a broad range of operations that could occur inside or outside of physical structures, and includes, but are not necessarily limited to, processing, storage, disposal, standby, maintenance, and decommissioning. A copy of the ISB procedure is provided in Appendix A.

Certain elements of the facility ISBs are common to all WHC-managed nuclear facilities. These common elements have been integrated into this

report to minimize the preparation, review, and approval time associated with the common elements and reduce the resources required to prepare facility-specific ISBs.

This report summarizes the institutional controls and safety programs currently established in the WHC controlled manual system as policies, procedures, and requirements as of December 1993. This report also documents the methodology and results of a compliance evaluation of the Order and ISB requirements to the WHC manual hierarchy. The results of these evaluations are documented in matrices that will help the user in identifying the applicable institutional and safety requirements and the current WHC procedures for implementation.

Section 2.0 identifies the DOE orders and the methodology used to assess the WHC compliance at the policy level. Section 3.0 provides a brief overview of the institutional controls and safety programs that implement the order requirements. Section 4.0 provides a summary of the Hanford site characteristics, and identifies the current list of WHC-managed nuclear facilities.

2.0 PURPOSE

The purpose of the Hanford generic ISB is to identify WHC programs and requirements that are an integral part of the authorization basis for nuclear facilities that are generic to all WHC managed facilities. Each facility-specific ISB or safety documentation will describe the facility's interface or deviation from the generic ISB elements. The purpose of these programs is to implement the DOE orders, as WHC becomes contractually obligated to implement the orders.

The Hanford generic ISB focuses on the institutional controls and safety requirements identified in DOE Order 5480.23, *Nuclear Safety Analysis Reports*. The ISB will identify common programs implemented at each nuclear facility addressing these controls and requirements. The following institutional controls and safety programs are addressed in the Hanford generic ISB:

- Radiation Protection
- As Low As Reasonably Achievable (ALARA)
- Occupational Safety
- Fire Protection
- Industrial Safety
- Industrial Hygiene
- Criticality Safety
- Training for Nuclear Facilities
- Radioactive Waste Management
- Occurrence Reporting
- Quality Assurance
- Configuration Management
- Conduct of Operations
- Emergency Planning
- Environmental Protection.

3.0 DOE ORDER AND ORDER CRITERIA SELECTION

All of the DOE orders were reviewed, and a subset of Orders was identified based on institutional controls and safety requirements identified above in Section 2.0. This subset was further reviewed to determine applicability to nuclear facilities. Based on this review the list in Table 3-1 was identified:

Following the identification of the appropriate DOE orders the criteria in each order were reviewed to identify applicable criteria. This process involved identifying criteria applicable to the contractor. After these criteria were identified an additional sort was performed to identify the criteria applicable to nuclear facilities and to identify the mandatory (i.e., "shall," "will") criteria. The assessments contained in Appendix B identify the DOE orders and the applicable criteria.

In addition to the DOE orders, Secretary of Energy Notice (SEN), SEN-35-91, *Nuclear Safety Policy*, was identified.

3.1 COMPLIANCE EVALUATION

The compliance evaluation included a series of substeps (see Figure 3-1), including an initial review of the WHC control manuals, a final review of the criteria to determine applicability, and a comparative evaluation of the control manual to the order criteria. If necessary additional WHC control manuals were identified during the compliance evaluation. These additional manuals included WHC Implementation plans (IP), environmental programs (EP), and site programs (SP).

The final step in the compliance evaluation process involved evaluating the WHC programs, described in Chapter 4.0, to the Order criteria. Although, the DOE Order selection process identified appropriate Orders based on the institutional controls or safety requirement (see Table 3-1), the compliance evaluation did not identify the individual criterion within the DOE Order by institutional control or safety requirement. This was not considered appropriate because many of the criteria within a DOE order are applicable to multiple institutional controls or safety requirements. Therefore, the evaluation assesses compliance of the WHC programs to the applicable criteria in each DOE order. The results of the assessment are provided in Appendix B.

Table 3-1. Selected DOE Orders (2 sheets)

Requirement	DOE order*	Order title
Radiation protection	5400.5	Radiation Protection of the Public and the Environment
	5480.11	Radiation Protection for Occupational Workers
As Low As Reasonably Achievable (ALARA)	5480.11	Radiation Protection for Occupational Workers

Table 3-1. Selected DOE Orders (2 sheets)

Requirement	DOE order*	Order title
Occupational safety	5483.1A	Occupational Safety and Health Program for DOE Contractor Employees at Government-owned Contractor-operated Facilities
Fire protection	5480.7A	Fire Protection
Industrial safety		
Industrial hygiene	5480.10	Contractor Industrial Hygiene Program
Criticality safety	5480.5	Safety of Nuclear Facilities
	5480.24	Nuclear Criticality Safety
Training for Nuclear Facilities	5480.18A	Accreditation of Performance-based Training for Category A Reactors and Nuclear Facilities
	5480.20	Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities
Radioactive waste management	5400.5	Radiation Protection of the Public and the Environment
	5820.2A	Radioactive Waste Management
Occurrence reporting	5000.3B	Occurrence Reporting and Processing of Operations Information
	5480.26	Trending and Analysis of Operations Using Performance Indicators
Quality assurance	5700.6C	Quality Assurance
Configuration management	4330.4A	Maintenance Management Program
	5480.21	Unreviewed Safety Questions
	5480.22	Technical Safety Requirements
	5480.23	Nuclear Safety Analysis Reports
	6430.1A	General Design Criteria
Conduct of operations	5480.19	Conduct of Operations Requirements for DOE Facilities
Emergency planning	5500.2B	Emergency Categories, Classes, and Notification and Reporting Requirements
	5500.3A	Planning and Preparedness for Operational Emergencies
Environmental protection	5400.1	General Environmental Program
	5400.5	Radiation Protection of the Public and the Environment
	5484.1	Environmental Protection, Safety, and Health Protection Information Reporting Requirements

*DOE Order 5480.4, *Environmental Protection, Safety, and Health Protection Standards*, in addition to the orders identified, provides standards that are applicable to all institutional controls and/or safety requirements.

4.0 PROGRAM OVERVIEW

The following subsections discuss the existing WHC programs that have been developed and implemented for each of the identified institutional controls and safety requirements at the time this report was prepared.

4.1 RADIATION PROTECTION

DOE Order/Regulatory Requirement:

5400.5, *Radiation Protection of the Public and the Environment*

Corresponding WHC Program Manual:

WHC-CM-1-3, *Management Requirements and Procedures*

WHC-CM-1-6, *WHC Radiological Control Manual*

WHC-CM-4-11, *ALARA Program Manual*

WHC-CM-7-5, *Environmental Compliance Manual*

WHC-EP-0137, *Best Available Technology Economically Achievable Guidance Document for the Hanford Site*

WHC-EP-0498, *Unit Dose Calculations for Westinghouse Hanford Company Facility Effluent Monitoring Plans*

DOE/RL-91-49, *U.S. DOE-RL Environmental Protection Implementation Plan*

DOE/RL-91-50, *Environmental Monitoring Plan vs Department of Energy Field Office, Richland*

HSRCM-1, *Hanford Radiological Control Manual*

The WHC has developed a program implementing the DOE requirements and guidance on radiation protection. This program consolidates radiological safety policy requirements for WHC along with radiation protection criteria and standards of the Hanford Site Radiological Control Manual (HSRCM). The HSRCM was prepared by the Hanford Contractors to provide site-specific addition, supplements, and clarifications to the DOE Radiological Control (RadCon) Manual.

The DOE, and thus WHC, is firmly committed to having a radiological control program of the highest quality. This applies to those DOE activities that manage radiation and radioactive materials and that may potentially result in radiation exposure to workers, the public, and the environment.

The DOE radiological control policy can be summarized by the following three key points:

- ALARA - Radiation exposure to onsite personnel, the public, and the environment shall be maintained As Low As Reasonably Achievable (ALARA). Radiation exposure of the work force, public, and the environment shall be controlled so that radiation exposures are well below regulatory limits and so that there is no radiation exposure without commensurate benefit.
- Ownership - Each individual involved in radiological work must demonstrate responsibility and accountability through an informed, disciplined, and cautious attitude toward radiation and radioactive material.

Figure 3-1. Compliance Evaluation Flow Diagram

- Excellence - Excellent performance is evident when radiation exposures are maintained well below regulatory limits, contamination is minimal, radioactive material is well controlled, and radiological spills or uncontrolled releases are prevented. Continuing improvement is essential to good radiological control.

These aspects of the DOE radiological control policy are implemented through the following six areas (DOE 1992):

- Radiological Standards - Establishment of Administrative Control Levels (ACL) below regulatory limits to administratively control and help reduce individual and collective radiation doses. Radioactive contamination control using engineering controls and proper worker performance to contain contamination at the source, reduce existing areas of contamination, and promptly decontaminate areas that become contaminated. Standardized radiological postings to alert personnel to the presence of radiation and radioactive materials and to aid them in minimizing exposures and preventing the spread of contamination.
- Conduct of Radiological Work - Identification of technical requirements for the conduct of work, including construction, modifications, operations, maintenance, and decommissioning that incorporate radiological criteria to ensure safety and maintain radiation exposures ALARA. Establishment of activities to be completed prior to beginning work, including preparation and approval of radiological work permits (RWP) and selection of proper protective clothing to be worn during contaminated material handling. Identification of entry and exit requirements for access to radiation areas and barrier requirements in and around radiation areas. Identification of radiological work controls. Evaluation of radiological work performance to analyze weaknesses or areas of programmatic breakdown of radiological controls, satisfy reporting requirements, and prevent further recurrence of undesired events. Provision of supplemental information for facilities where operations involve significant source terms of plutonium, uranium, or tritium, accelerator facilities, or facilities using radiation-generating devices. Identification of specific control methods for construction and restoration projects.
- Radioactive Materials - Identification of requirements for the identification, storage and control of radioactive material; the release and transportation of radioactive material; radioactive source controls; solid radioactive waste management; control of radioactive liquids and airborne radioactivity; and support activities, including personnel protective equipment, laundry, decontamination activities, and portable air-handling equipment.
- Radiological Health Support Operations - Identification of requirements for external and internal dosimetry programs, respiratory protection programs, handling of radiologically contaminated personnel, radiological monitoring and survey programs, and instrumentation and calibration programs.

- Training and Qualification - Establishment of requirements to ensure personnel have the training to work safely in and around radiological areas and maintain their individual radiation exposure and the radiation exposure of others ALARA. Training and qualification requirements apply to personnel entering the Hanford Site, general employees, Radiological Workers, Radiological Control Technicians, and those personnel working in plutonium, uranium, tritium, or accelerator facilities.
- Radiological Records - Identification of requirements for preparing and retaining radiologically related records that are part of the Hanford Radiological Records Program (HRRP), including employee and visitor radiological records, radiological control procedures, radiological surveys, and instrumentation and calibration records.

4.2 AS LOW AS REASONABLY ACHIEVABLE (ALARA)

DOE Order/Regulatory Requirement:

5480.11, *Radiation Protection for Occupational Workers*

Corresponding WHC Program Manual:

WHC-CM-1-3, *Management Requirements and Procedures*

WHC-CM-1-6, *WHC Radiological Control Manual*

WHC-CM-4-1, *Emergency Plan*

WHC-CM-4-9, *Radiological Design*

WHC-CM-4-11, *ALARA Program*

WHC-CM-4-16, *Dosimetry and Medical Services Manual*

WHC-CM-4-43, *Emergency Management Procedures*

The acronym ALARA is used to denote the concept of ensuring minimization of exposures. This is accomplished by conducting company activities involving hazardous substances and conditions in compliance to this manual.

The concept of ALARA has been expanded from classical ALARA, that of minimization of radiological exposures, to application of exposure minimization for all hazardous substances and conditions.

Current radiation protection philosophy assumes that any exposure to radiation, however small, involves some degree of risk. Because of this assumption, the International Commission on Radiological Protection (ICRP) and the National Commission on Radiological Protection (NCRP) have recommended that radiation exposures be reduced to ALARA. The concept of ALARA implies that each activity involving radiation exposure shall be scrutinized to determine if practices or materials can be used or modified to reduce radiation doses. However, the concept of ALARA does not imply that doses should be reduced to levels so low or trivial as to be inappropriate relative to the cost of radiation protection and the reasonable allocations of health protection resources.

It is the policy of the DOE and WHC to extend the application of ALARA to activities involving exposure to nonradiological hazardous substances and conditions. The WHC policy on ALARA is described in detail in WHC-CM-1-3, *Management Requirements and Procedures*, MRP 5.37, "ALARA Program." The WHC

policy on radiation protection is in WHC-CM-1-3, MRP 5.38, "Radiation Protection," and WHC-CM-1-6, *WHC Radiological Control Manual*. The WHC policy on industrial safety and fire protection is in WHC-CM-1-3, MRP 5.7, "Industrial Safety and Fire Protection," and WHC-CM-4-3, *Industrial Safety Manual*, Volume 1, Safety Standards, and Volume 2, Safety Guides.

Within WHC ALARA is achieved by the establishment or implementation of the ALARA Program elements. The elements that comprise the ALARA Program are as follows:

1. Job Planning. As Low As Reasonably Achievable practices are factored into plans and procedures for each job or job category.
2. Job Monitoring. Verification that each job or job category is performed as planned or in accordance with procedure. Occupational doses are monitored and managed by utilizing a dose tracking system, which should be tailored to each facility's or project's needs.
3. Post-Job Review. Each job or job category is periodically reviewed to ensure jobs are performed in compliance with job planning and job monitoring requirements and that work is performed with consideration to ALARA.
4. Project Design and Review. New facilities or modifications to existing facilities incorporate ALARA considerations.
5. ALARA Committee. Westinghouse Hanford Company has an ALARA Committee that integrates, assesses, and implements company ALARA Program activities.
6. ALARA Teams or Points-of-Contact. Each operational unit has an ALARA team or point-of-contact that administers the ALARA Program and ensures compliance with ALARA Program requirements.
7. ALARA Awareness Program. The ALARA Awareness Program consists of dissemination of ALARA principles, practices, and concepts on a company-wide basis.

4.3 OCCUPATIONAL SAFETY/INDUSTRIAL SAFETY AND HYGIENE

DOE Order/Regulatory Requirement:

5483.1A, *Occupational Safety and Health Program for DOE Contractor Employees at Government-owned Contractor-operated Facilities*
 5480.10, *Contractor Industrial Hygiene Program*

Corresponding WHC Program Manual:

WHC-CM-1-1, *Management Policies*
 WHC-CM-1-2, *Organizations Charts and Charters*
 WHC-CM-1-3, *Management Requirements and Procedures*
 WHC-CM-4-2, *Quality Assurance Manual*
 WHC-CM-4-3, *Industrial Safety Manual*
 WHC-CM-4-40, *Industrial Hygiene Manual*
 WHC-CM-7-5, *Environmental Compliance Manual*

Westinghouse Hanford Company has established a program that address the health and safety of all employees, as well as visitors, working in or around a WHC managed facility. This program has been established to ensure that a safe work place environment is provided and maintained, and that the safety requirements implemented at WHC, fully reflect established DOE and industry codes, standards, requirements, and statutory regulations.

The primary program objectives are as follows:

1. Ensure that the work place is free from or protected against recognized hazards likely to cause injury or death.
2. Give employees the opportunity to participate in the industrial safety program.
3. Clearly define individual and organizational responsibilities for industrial safety.
4. Ensure compliance with all occupational safety standards prescribed by the DOE and other regulatory agencies.

The industrial Safety group is specifically responsible for the following:

1. Provide safety expertise, assistance, and support for WHC operations and activities
2. Develop and administer programs to control and minimize safety hazards and promote continuous improvement in safety performance throughout WHC operations
3. Monitor WHC safety experience to assess program performance and provide performance and trend reports
4. Ensure that employee safety records are maintained properly, coordinating with site service organizations as necessary
5. Provide guidance to the training organization to support the development and presentation of relevant industrial safety topics.

4.4 FIRE PROTECTION

DOE Order/Regulatory Requirement:
5480.7A, *Fire Protection*

Corresponding WHC Program Manual:
WHC-CM-1-3, *Management Requirements and Procedures*
WHC-CM-4-3, *Industrial Safety Manual*
WHC-CM-4-41, *Fire Protection Program*

The WHC Fire Protection Program is administered through three separate organizations that each addresses a different aspect of the program.

The Fire Protection Programs group (FPP) is responsible for program development and interpretations, independent review, and technical engineering support in the field and to the facilities. This group is also responsible for establishing Fire Hazards Analysis (FHA) policy. The FHA, which is the responsibility of the line organization, will be included/summarized in the facility specific ISBs as identified in the implementation plan.

The Hanford Fire Department (HFD) is responsible for fire suppression, fire system inspection/testing, hazardous material (HAZMAT) response, and medical response for the Site. The HFD has four fully staffed stations located strategically across the Site. The main fire station is located between the 200 East and 200 West Areas. The other stations are located at the 100, 300, and 400 Areas.

Fire Systems Support is responsible for system maintenance and repair activities, except where interface agreements with other organizations exist.

The first purpose of the *Fire Protection Program Manual*, WHC-CM-4-41, is to provide employees who are not fire protection professionals with the information necessary to ensure that WHC's commitment to uncompromising integrity and adherence to the highest safety standards is met in fire protection.

Fire protection codes and standards requirements are derived from DOE 5480.4, and other requirements applicable to WHC operations and activities are identified in DOE 5480.7A and DOE 6430.1A. The objective in this manual has not been to list each and every one of the requirements in these standards, but to set forth those requirements of greatest concern and relevance to the manager or engineer (especially building administrators) expected to use this manual.

Except for certain applications (such as new designs and modifications) the manual users are not expected to require access to National Fire Protection Association (NFPA) or other industry codes and standards. References to such documentation have been made only when required, with the expectation that manual users will request assistance from the Fire Protection Programs group if further details are desired or required.

The Fire Protection Programs group maintains a staff of qualified fire protection engineers to support the WHC Fire Protection Program and assist other organizations in loss prevention and in resolving fire protection concerns. The Hanford Fire Department fire marshal is also available to assist in resolving fire prevention concerns.

4.5 CRITICALITY SAFETY

DOE Order/Regulatory Requirement:
5480.24, *Nuclear Criticality Safety*

Corresponding WHC Program Manual:
WHC-CM-4-29, *Nuclear Criticality Safety Manual*
WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*

The WHC Nuclear Criticality Safety Program is established to ensure that accidental criticality will not occur in any WHC operation. The potential for accidental criticality exists whenever sufficient quantities of fissionable materials are processed, stored, or transported. This is prevented by controlling the design and operation of equipment and processes to positively ensure that the conditions required for criticality will not occur.

This section provides an overall description of the program and implements the applicable requirements of WHC-CM-1-3, *Management Requirements and Procedures* and MRPs 5.23, "Nuclear Facility Safety" and 5.24, "Nuclear Reactor Safety."

The Criticality Safety program also establishes a graduated facility classification system used to categorize facilities according to the criticality safety controls required and specifies the functional and organizational responsibilities for implementing program requirements. Where specific program requirements are addressed, the appropriate section(s) of this manual are identified.

Facilities that contain less than 3% of a minimum critical mass (MCM), or that only contain exempt materials are exempt from this program, except that facilities located within the 25-rem boundary around a fissionable material facility must comply with the requirements of WHC-CM-4-29, Section 11.0, "Criticality Alarm System." For a more detailed discussion of exempt materials, see WHC-CM-4-29, Section 2.0 of this manual.

Facilities that contain or could contain more than 3% of an MCM shall be classified into one of the following categories:

- Fissionable material facility
- Limited control facility
- Isolated facility.

The facility safety analyses documentation shall justify the proposed facility classification. Approval of the safety analyses shall constitute facility status approval.

Table 1-1, WHC-CM-4-29, lists of facilities in each category. This table, reviewed and updated periodically by Criticality Engineering Analysis, is intended only as a convenient reference and does not govern the status of facilities.

Ex-reactor operations in nuclear reactor facilities shall be governed by the same requirements as those applied to nonreactor facilities.

The operating organization responsible for each facility permitted to possess more than an exempt quantity of fissionable material (fissionable material facilities, limited control facilities, and isolated facilities) shall appoint a qualified criticality safety representative (CSR). For facilities where the workload permits, one CSR may represent more than one facility. Depending on facility needs, alternate and designated back-shift assistant CSRs may also be appointed.

4.6 TRAINING FOR NUCLEAR FACILITIES

DOE Order/Regulatory Requirement:

5480.18A, *Accreditation of Performance-based Training for Category A Reactors and Nuclear Facilities*

5480.20, *Personnel Selection, qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities*

Corresponding WHC Program Manual:

WHC-CM-1-1, *Management Policies*

WHC-CM-1-2, *Organization Charts and Charters*

WHC-CM-1-3, *Management Requirements and Procedures*

WHC-CM-1-5, *Standard Operating Procedures*

WHC-CM-1-6, *WHC Radiological Control Manual*

WHC-CM-2-15, *Training Administration Manual*

WHC-CM-4-1, *Emergency Plan*

WHC-CM-4-3, *Industrial Safety Manual*

WHC-CM-4-33, *Security Manual*

WHC-SP-0329, *400 Area Training Plans*

There is, within WHC, an organization responsible for training all WHC employees. This organization has developed a program designed to comply with the DOE orders. This training program includes classroom instruction, on-the-job-training, and methods to evaluate the employees understanding of the training and certification of employees who have successfully completed the training. A segment of the training programs apply directly to the operation of nuclear facilities. The underlying principal in the training programs is to ensure safe operation of WHC managed facilities. This entails developing training programs for a number of job categories, e.g., operators, supervisors, managers, craftpersons, technical support staff, and visitors.

The nuclear facility training programs are designed to ensure that those individuals responsible for the operation or supporting the operation of a nuclear facility achieve and maintain a high degree of technical understanding and proficiency. To ensure that this goal is met, training programs, developed for specific job categories, must contain job category specific elements. The following identifies these elements by job category.

Nuclear operator training and certification:

1. Operations managers and supervisors who are adequately trained and technically competent, and who are committed to leading and directing the training and certification of their subordinate operators
2. Operator trainees who are capable of and motivated to complete the required training
3. Well developed and technically adequate performance-based training materials and curricula
4. A sufficient number of technically competent and dedicated training staff to support the needs of the operating staff.

5. Sufficient time assigned and dedicated to training on all of the tasks on which the operator is required to be qualified and proficient.

Craftspersons at reactor and non-reactor nuclear facilities:

1. Maintenance managers and supervisors who are adequately trained and technically competent, and who are committed to leading and directing the training of their subordinate craftspersons
2. Maintenance trainees who are capable of and motivated to complete the required training
3. Well developed and technically adequate performance-based training materials and curricula
4. Sufficient numbers of technically competent and dedicated training staff to support the needs of the maintenance staff.

Technical support staff at reactor and non-reactor nuclear facilities:

1. Technical support managers and supervisors who are adequately trained and technically competent, and who are committed to leading and directing the training of their subordinate staff
2. Technical support trainees who are capable of and motivated to complete the required training
3. Well developed and technically adequate performance-based training materials and curricula
4. Sufficient numbers of technically competent and dedicated training staff to support the needs of the technical support staff.

Visitors, contracted personnel, and temporary personnel at reactor and non-reactor nuclear facilities:

1. With respect to visitors, contracted personnel, and temporary personnel, operating organizations shall ensure that these individuals are qualified to perform their assigned tasks by documenting at least one of the following:
 - a. The satisfactory result from an audit of visitor/contractor/temporary records that relates to qualification of the individual being considered for assignment; or
 - b. The operating organization's previous verification (within 1 year) of the visitor/contractor/temporary employee's ability to perform assigned tasks safely and efficiently; or

- c. The visitor/contractor/temporary employee's participation in those segments of the operating organization's qualification program that are considered pertinent to accomplishing the task that will be performed.
2. In addition, these personnel, who do not meet the training requirements, when working on safety-related structures, systems, and/or components identified in the facility safety analysis report shall be supervised by an individual who meets the qualification criteria established by the organization responsible for the conduct of such activities.

4.7 RADIOACTIVE WASTE MANAGEMENT

DOE Order/Regulatory Requirement:

5400.5, *Radiation Protection of the Public and the Environment*
5820.2A, *Radioactive Waste Management*

Corresponding WHC Program Manual:

WHC-CM-1-1, *Management Policies*
WHC-CM-1-3, *Management Requirements and Procedures*
WHC-CM-1-6, *WHC Radiological Control Manual*
WHC-CM-2-14, *Hazardous Material Packaging and Shipping*
WHC-CM-4-9, *Radiological Design*
WHC-CM-4-11, *ALARA Program Manual*
WHC-CM-4-29, *Nuclear Criticality Safety Manual*
WHC-CM-5-16, *Solid Waste Management*
WHC-CM-7-5, *Environmental Compliance Manual*
WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*
WHC-EP-0063-3, *Hanford Site Solid Waste Acceptance Criteria*

The WHC has developed a program implementing the DOE guidance on radioactive waste management. This program implements the requirements of DOE Order 5820.2A, *Radioactive Waste Management*, and DOE Order 5400.5, *Radiation Protection of the Public and the Environment*.

DOE Order 5820.2A describes how solid, liquid, and gaseous radioactive and mixed wastes are treated, packaged, stored, transported, and disposed of. Radiological operations generating radioactive waste should be designed and developed to permit segregation, monitoring, treatment, storage, and disposal. Also, radioactive waste minimization goals and practices should be developed and implemented in order to reduce material usage and maximize recycling activities.

Technical and administrative controls should be established to minimize the volume of mixed waste generated and the amount of radioactive material in such waste, identify and segregate mixed waste to avoid combining with other types of waste, and ensure the most stringent regulatory requirements for mixed waste should be applied to waste classification and disposal.

A water management program should be maintained to identify, trend, and eliminate unnecessary sources of radioactive liquid waste, including aggressive measures to identify and repair leaks. Also, activities that

produce radioactive liquid waste should be suspended unless sufficient processing, collection, and storage capacity is available to accommodate the waste. Radioactive drain systems should be controlled and evaluated to prevent environmental releases.

DOE Order 5400.5 provides radioactive liquid waste discharge requirements:

- Radioactive liquid waste discharges should be controlled on a batch basis to enhance monitoring capability and to reduce the potential for inadvertent release.
- Radioactive liquid waste discharges should be analyzed prior to their release and monitored during release, and the release shall be terminated before exceeding predetermined (regulatory) limits.
- Radioactive liquid waste that cannot be discharged shall be solidified and disposed of as solid radioactive waste.

Processes and activities that have the potential to produce airborne radioactivity shall include engineering controls to limit releases. The Radiological Control Organization shall be notified when engineering controls that prevent worker exposure to airborne radioactivity, such as barriers, gloveboxes, and glovebags, are compromised. Preventative maintenance and surveillance procedures shall be established to ensure that equipment controls are maintained in an operable condition for containment of airborne radioactivity.

4.8 OCCURRENCE REPORTING

DOE Order/Regulatory Requirement:

5000.3B, *Occurrence Reporting and Processing of Operations Information*
5480.26, *Trending and Analysis of Operations Using Performance Indicators*

Corresponding WHC Program Manual:

WHC-CM-1-3, *Management Requirements and Procedures*
WHC-CM-1-4, *Corrective Action Management Manual*

The WHC has developed a program implementing the DOE guidance on occurrence reporting. This program implements the requirements of DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*, by establishing procedures and requirements for timely reporting of occurrences to DOE and WHC management.

The WHC occurrence reporting program applies to all WHC organizations and the activities associated with the reporting and processing of reports of events or conditions that could have adverse implications for safety, health, environment, quality assurance, security, or operations.

4.9 QUALITY ASSURANCE

DOE Order/Regulatory Requirement:
5700.6C, *Quality Assurance*

Corresponding WHC Program Manual:

WHC-CM-1-1, *Management Policies*
WHC-CM-1-2, *Organization Charts and Charters*
WHC-CM-1-3, *Management Requirements and Procedures*
WHC-CM-4-2, *Quality Assurance Manual*

The WHC has developed a program implementing the DOE guidance on quality assurance. As required by DOE Order 5700.6C, *Quality Assurance*, the WHC Quality Assurance program complies with those recognized standards providing interpretive guidance for developing and implementing a quality assurance program applicable to the types of work required by this site's current mission.

The WHC quality assurance program controls shall be applied to items and activities to an extent consistent with their importance to health, safety, reliability, operational continuity and the environment, specifically program controls shall be applied to all items and activities affecting safety class 1 and 2 systems, structures, and components as defined in WHC-CM-1-3, *Management Requirements and Procedures*, MRP 5.46, "Safety Classification of Systems, Components, and Structures."

Management policy shall emphasize the role of management in assessing the technical needs and quality expectations, in establishing performance goals and in providing resources to facilitate the achievement of these goals. Also, management of those divisions/departments implementing the quality assurance program shall regularly assess the adequacy of the program and ensure its effective implementation.

4.10 CONFIGURATION MANAGEMENT

DOE Order/Regulatory Requirement:
4330.3A, *Maintenance Management Program*
5480.21, *Unreviewed safety questions*
5480.22, *Technical Safety Requirements*
5480.23, *Nuclear Safety Analysis Reports*

Corresponding WHC Program Manual:
WHC-CM-1-3, *Management Requirements and Procedures*
WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*
WHC-CM-6-1, *Standard Engineering Practices*
WHC-CM-6-32, *Safety Analysis and Regulation Work Procedures*
WHC-SP-0866, *WHC Conduct of Maintenance Manual*

Although, WHC has not developed a configuration management program, other programs exist within WHC that address configuration management issues. Configuration management (CM), as defined in draft DOE 5480.CM, *Configuration Management Program*, is defined as an integrated management program encompassing design control, document control and change control. The purpose

of the CM program is to assure that facility physical configuration conforms with the reviewed and approved design requirements and to ensure that the facility and the design requirements are accurately reflected in the facility documentation.

Changes in the design/configuration of the facility are addressed in WHC-CM-6-1, *Standard Engineering Practices*. This manual establishes the Engineering Practices (EPs), which ensure that uniform methods are in place for all WHC engineering tasks. These practices provide uniform methods for such tasks as design review, configuration control, change control, engineering documentation preparation, and review/approval requirements. In addition, all facility modifications will be evaluated, using the ISB as the authorization basis, in accordance with WHC-CM-1-3, MRP 5.12, "Identifying and Resolving Unreviewed Safety Questions."

An annual review of the facility safety analysis reports is required by WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*. This annual review serves as configuration management tool, ensuring that the safety documentation accurately reflects the facility design and operation. With respect to equipment within a facility, a standardized Job Control System (JCS) has been implemented. This system is applicable when performing maintenance, modifications, and related services (including contractor and construction interfaces) when the maintenance work impacts a facility. The JCS shall result in efficient and effective management of work and ensure compliance with engineering, health, safety, environmental, and quality standards and requirements.

4.11 CONDUCT OF OPERATIONS

DOE Order/Regulatory Requirement:

5480.19, *Conduct of Operations Requirements for DOE Facilities*

Corresponding WHC Program Manual:

WHC-CM-1-1, *Management Policies*

WHC-IP-0836, *Order of Compliance Administration*

WHC-SP-0708, *Westinghouse Hanford Conduct of Operations Manual*

Conduct of Operations at WHC are addressed in two types of control manuals. One type of manual describes the WHC policy with respect to conduct of operations. The other type of manual describes facility specific conduct of operations that implement the policies described in WHC policy. For example, Tank Waste Remediation has prepared a document entitled "Waste Tank Administration" that describes the programs and procedures that are in place to implement WHC policy.

The WHC conduct of operations policy is described in WHC-CM-1-1, *Management Policies*. This policy dictates that all facilities are required to develop and implement a program that ensures that all operations are conducted safely, in compliance with safety and environmental requirements, and without undue risk to people or the environment. The programs and/or procedures that will be developed at each facility will address the following points:

1. Developing and fostering a strong safety, health, and environmental protection culture in the company, reflecting our basic safety philosophy that: All occupational injuries and illnesses are preventable; safety is everyone's responsibility; working safely is a condition of employment.
2. Ensuring that each person understands and accepts personal responsibility for working safely, obeying safety rules, recognizing and reporting any unsafe conditions, and stopping any act thought to be unsafe.
3. Managing our facilities with uncompromising integrity, striving to eliminate conditions and discharges that insult the environment, and providing safe and healthful work places. All activities or conditions that may result in injuries or illnesses must be promptly corrected or controlled. Every manager is responsible and accountable for the safety of assigned employees and facilities.
4. Ensuring that environmental, safety, and health protection policies and requirements meet or exceed established DOE and industry codes, standards, requirements, and statutory regulations.
5. Identifying and documenting the safety basis of every WHC-managed facility and activity. This documentation shall describe measures taken to prevent or mitigate risks, and analyze their effectiveness.
6. Ensuring that individuals and their organizations accept full responsibility for safety and protection of the environment, that they conduct operations in strict compliance with all requirements and procedures, and are trained and qualified to perform their assigned tasks.
7. Limiting human exposures to radiation or hazardous materials to levels below federal and state regulatory limits--and, further, to levels ALARA.
8. Ensuring that all activities are strictly controlled. From design, to operation and maintenance, all components, systems, and processes must meet safety and environmental requirements. Engineering standards, technical specifications, and quality assurance data must be valid, retrievable, and oriented toward safe operation.
9. Maintaining effective, independent oversight with authority to shut down any unsafe or undisciplined operation.

4.12 EMERGENCY PLANNING

DOE Order/Regulatory Requirement:

5500.2B, *Emergency Categories, Classes, and Notification and Reporting Requirements*

5500.3A, *Planning and Preparedness for Operational Emergencies*

Corresponding WHC Program Manual:

WHC-CM-1-2, *Organizations Charts and Charters*
 WHC-CM-1-3, *Management Requirements and Procedures*
 WHC-CM-4-1, *Emergency Plan*
 WHC-CM-4-43, *Emergency Management Procedures*
 WHC-CM-4-44, *Emergency Preparedness Administration*
 WHC-IP-0628, *Facility Drill Guide*

The WHC has developed an emergency preparedness plan, in the form of the WHC Emergency Preparedness Program, implementing the DOE guidance on emergency planning. The plan applies to all WHC operations, facilities, and personnel including those of subcontractors, vendors, visitors, and non-WHC tenants in WHC-controlled facilities. It represents the top-level WHC emergency plan and establishes requirements and criteria for sub-tier facility/building emergency plans. The plan establishes a WHC emergency response organization to manage and respond to credible emergency conditions. It also defines company-wide systems for reporting emergency conditions; for requesting emergency assistance; and for informing WHC management and other site tenants of such events. Specific plans and procedures for response to and recovery and restoration from specific emergency conditions are addressed in the implementing building emergency plans and facility and organizational operating procedures.

The WHC emergency preparedness plan complies with DOE requirements for emergency planning, as specified in the DOE Order 5500 series and with related DOE-RL Directives. The plan has been coordinated with the emergency preparedness plans of DOE-RL and other DOE-RL contractors. Taken as a whole, these plans provide an integrated emergency response capability for the Hanford Site.

The purpose and objectives of this plan are as follows:

1. A coordinated emergency response organization with the capability of handling nuclear, industrial, security, radiological, and nonradiological hazardous materials incidents.
2. Event classification criteria and emergency response recommendations to protect onsite personnel and the public in the event of a serious radiological or nonradiological hazardous materials emergency.
3. Emergency response support during safeguards and security events.
4. Response plans for emergencies involving natural phenomena or national emergencies that affect site personnel or facilities.
5. Requirements for emergency personnel training and emergency plan maintenance to ensure an adequate state of emergency preparedness.
6. Ensure personnel safety, minimization of injury or loss of life, and provision for prompt and efficient treatment for injured persons.
7. Continuity of leadership at all times and during all postulated emergency events.

8. Ensure that WHC has the proper equipment and trained personnel and facilities to effectively respond to a Hanford Site emergency.
9. Minimization of the effects of incidents on the health and safety of the general public.
10. Minimization of property damage and maximization of the continuity of DOE programs.
11. Prompt internal and external communication with DOE contractors, and through DOE with other site tenants and regional agencies, should an accident occur.

The basic philosophy for handling emergencies is that personnel must be able to properly assess and take immediate steps to minimize the effects of the event. For this reason, trained personnel having event responsibilities are predesignated. The WHC president, the emergency director, area emergency directors, building emergency directors, building wardens, the emergency duty officer, and other site contractor area emergency directors all have the authority to implement this emergency plan.

4.13 ENVIRONMENTAL PROTECTION

DOE Order/Regulatory Requirement:

5400.1, *General Environmental Program*

5400.5, *Radiation Protection of the Public and the Environment*

5484.1, *Environmental Protection, Safety, and Health Protection Information Reporting Requirements*

Corresponding WHC Program Manual:

WHC-CM-1-2, *Organizations Charts and Charters*

WHC-CM-1-3, *Management Requirements and Procedures*

WHC-CM-1-6, *Radiological Control Manual*

WHC-CM-4-2, *Quality Assurance Manual*

WHC-CM-4-3, *Industrial Safety Manual*

WHC-CM-4-11, *ALARA Program Manual*

WHC-CM-7-5, *Environmental Compliance Manual*

WHC-EP-0137, *Best Available Technology Economically Achievable Guidance Document for the Hanford Site*

WHC-EP-0438, *A Guide for Preparing Hanford Facility Effluent Monitoring Plans*

DOE/RL-91-49, *Environmental Protection Implementation Plan*

DOE/RL-91-50, *Environmental Monitoring Plan United States Department of Energy Field Office, Richland*

The WHC has developed a program implementing the DOE guidance on environmental protection. The purpose of this program is to establish the environmental compliance requirements and guidelines for WHC in conjunction with applicable DOE Orders and federal, state, and local laws and regulations. WHC's environmental protection program is divided into 11 sections:

- Air Quality - Definition of standards for the management of WHC-managed activities which generate or discharge air pollutants to the atmosphere such that WHC-managed stationary sources of air

pollutants are designed, constructed and managed in a manner that protects the environment and human health, minimizes emissions to the atmosphere, and meets applicable regulatory requirements.

- Hazardous Material Management - Establishment of environmental guidance for all activities involving the purchase, sale, manufacture, processing, importation, exportation, and use of chemical substances by WHC.
- NEPA/SEPA - Establishment of requirements and guidelines for WHC to comply with the State Environmental Policy Act (SEPA), the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations, DOE NEPA guidelines, and DOE Orders.
- Records, Reporting and Response Activities - Identification of responses required in the event of a radioactive or hazardous material release to the environment. Outline of the requirements for monitoring and reporting chemical information including reporting under the Emergency Planning and Community Right-to-Know regulations. Identification of DOE environmental compliance support service and information channels to provide a method for coordinating environmental compliance issues with DOE.
- Restoration and Remediation - Establishment of requirements for activities conducted within inactive waste sites (radioactive, nonradioactive, hazardous, and nonhazardous) including those designated as surplus facilities.
- Solid Waste Management - Definition of environmental requirements for the WHC solid waste disposal and control program. Provision of guidance for the planning, construction, and operation of waste facilities to ensure protection of workers and the environment, proper management of waste from its point of generation to its final disposition, and compliance with the State of Washington Dangerous Waste Regulations, EPA regulations, and those imposed by DOE.
- Water Quality - Establishment of WHC requirements and guidelines for Hanford Site radioactive and nonradioactive liquid effluent disposal; the prevention of ground and surface water degradation from current and future activities for site radioactive and nonradioactive liquid effluent disposal; ensuring all new WHC facilities and all WHC facilities being modified are operated in a manner that protects the environment and safety of the public, minimizes liquid effluent release to the environment, and meets all applicable regulatory requirements; and, drinking water supply systems on site.
- New and Modified Facilities - Identification of requirements to ensure compliance with the environmental requirements related to air, water, and solid waste management applicable to the construction of new facilities or the modification of existing facilities.

- Regulatory Permitting - Provision of an overview of the regulatory permitting process necessary to ensure compliance with environmental requirements and a summary of permitting requirements and responsibilities.
- Environmental Training and Compliance Verification - Description of the technical, policy, and regulatory basis for WHC requirements that verify compliance with environmental protection program requirements. Establishment of the basis for WHC requirements for compliance with the environmental protection program and the minimum training required to implement the WHC environmental protection program.
- Preservation of Cultural and Natural Resources - Description and delineation of the requirements for the preservation of historical and cultural resources and for the protection of plant and wildlife species on the Hanford Site.

The WHC environmental protection program is implemented at facility-specific levels through facility effluent monitoring programs and RCRA Part B Permits.

5.0 END USES GENERIC ISB

The purpose of the Hanford Generic ISB is to identify WHC programs and requirements that are an integral part of the authorization basis for nuclear facilities that are generic to all WHC managed facilities. The purpose of these programs is to implement the DOE orders, as WHC becomes contractually obligated to implement the orders. The generic ISB order compliance worksheets (see Appendix B) identify and assess the common WHC programs addressing the DOE orders that implement the institutional controls and safety requirements identified in DOE Order 5480.23, *Nuclear Safety Analysis Reports*.

The Generic ISB order compliance worksheets, in addition to providing documentation linking the DOE orders and directives to WHC programs, serves primarily two functions. One function is to assess the existing WHC programs to identify areas where the programs address the order criteria and, conversely, to identify those areas where compliance to the order criteria can not be determined. The other function is to provide facilities a tool that can be used to evaluate compliance to the DOE orders and directives via documented implementation of appropriate WHC programs. This evaluation would be included in the facility-specific safety documentation (e.g., safety analysis reports, interim safety basis).

The assessment of the WHC programs, with respect to the DOE order criteria and directives (see Appendix B), was based on the interpretation of the intent of the DOE order criteria or directives and WHC program descriptions. Based on the results of the assessment, WHC policy and program organizations can use the order compliance worksheets as a mechanism to identify and prioritize future activities. That is, for those areas where compliance to the order criteria could not be determined, activities such as updates and enhancements to the existing WHC programs should be scheduled.

Nuclear facilities required by DOE Order 5480.23 to prepare facility-specific safety documentation can use the compliance worksheets contained in Appendix B to demonstrate compliance to the DOE orders. That is, the worksheets can be used to (1) identify DOE order criteria that are applicable to the nuclear facility and (2) identify the WHC programs that currently exist and demonstrate compliance with the order criteria (WHC control manuals in Appendix B are current as of December 1993). The facility-specific safety documentation would contain similar compliance worksheets that describe the facility's interface or deviation from the WHC programs or generic ISB elements.

These facility-specific compliance worksheets (see Figure 5-1) should identify the DOE order and, if necessary, the applicable order criteria, the WHC program, and the facility-specific documents (or lack of documentation) that address or implement the WHC program. The level of detail required in the facility-specific compliance worksheets to demonstrate compliance to the DOE orders is primarily based on the number of applicable criteria in a DOE order.

For example, if all the criteria are applicable, 'ALL' would be written in the first column (left-to-right), the second column would summarize the order, the third column would identify the implementing WHC programs, the fourth column would identify the implementing facility-specific programs, and the fifth column would summarize the facility-specific program. In this case the number of entries is based on the number of WHC or facility-specific implementing programs.

Another example, requiring a greater level of detail, would be the case where only select criteria within the order are applicable. This would require identifying and describing each criteria and the corresponding WHC and facility-specific programs. However, where entire sections or chapters are applicable, a similar process can be followed as described in the preceding example. That is, the section or chapter would be identified in the first column and summarized in the second column and the WHC and facility-specific programs would be addressed as described above.

6.0 REFERENCES

DOE Order 4330.4A, *Maintenance Management Program*, U.S. Department of Energy, Washington, D.C.

DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*, U.S. Department of Energy, Washington, D.C.

DOE Order 5400.1, *General Environmental Program*, U.S. Department of Energy, Washington, D.C.

DOE Order 5400.5, *DOE Radiation Protection of the Public and the Environment*, U.S. Department of Energy, Washington, D.C.

DOE Order 5480.4, *Environmental Protection, Safety, and Health Protection Standards*, U.S. Department of Energy, Washington, D.C.

- DOE Order 5480.5, *Safety of Nuclear Facilities*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.7, *Fire Protection*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.10, *Contractor Industrial Hygiene Program*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.11, *Radiation Protection for Occupational Workers*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.18A, *Accreditation of Performance-based Training for Category A Reactors and Nuclear Facilities*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.20, *Personnel Selection, qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.21, *Unreviewed Safety Questions*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.22, *Technical Safety Requirements*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.23, *Nuclear Safety Analysis Reports*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.24, *Nuclear Criticality Safety*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.26, *Trending and Analysis of Operations Information Using Performance Indicators*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5483.1A, *Occupational Safety and Health Program for DOE Contractor Employees at Government-owned Contractor-operated Facilities*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5484.1, *Environmental Protection, Safety, and Health Protection Information Reporting Requirements*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5500.2B, *Emergency Categories, Classes, and Notification and Reporting Requirements*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5500.3A, *DOE Planning and Preparedness for Operational Emergencies*, U.S. Department of Energy, Washington, D.C.
- DOE Order 5700.6C, *Quality Assurance*, U.S. Department of Energy, Washington, D.C.

Figure 5-1. Facility-Specific Compliance Worksheet Example.

Institutional Control: _____		DOE Order: _____		
Applicable Order Criteria	Criteria Description	WHC Implementing Program	Facility Implementing Program	Description of the Facility Implementing Program

DOE Order 5820.2A, *Radioactive Waste Management*, U.S. Department of Energy, Washington, D.C.

DOE Order 6430.1A, *General Design Criteria*, U.S. Department of Energy, Washington, D.C.

DOE/RL-91-49, *United States Department of Energy Field Office Richland Environmental Protection Implementation Plan*, U.S. Department of Energy, Richland Field Office, Richland, Washington.

DOE/RL-91-50, *Environmental Monitoring Plan United States Department of Energy Field Office Richland*, U.S. Department of Energy Richland Field Office, Richland, Washington.

DOE, 1992, *Hanford Site Radiological Control Manual*, HSRCM-1, U.S. Department of Energy, Richland, Washington.

WHC-CM-1-1, *Management Policies*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-2, *Organizations Charts and Charters*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-4, *Corrective Action Management Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-5, *Standard Operating Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-6, *WHC Radiological Control Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-2-14, *Hazardous Material Packaging and Shipping*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-2-15, *Training Administration Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-1, *Emergency Plan*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-2, *Quality Assurance Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-3, *Industrial Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-9, *Radiological Design*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-10, *Radiation Protection*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-11, *ALARA Program Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-29, *Nuclear Criticality Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-33, *Security Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-40, *Industrial Hygiene Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-43, *Emergency Management Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-44, *Emergency Preparedness Administration*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-5-16, *Solid Waste Management*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-6-32, *Safety Analysis and Regulation Work Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-7-5, *Environmental Compliance Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-EP-0063-3, *Hanford Solid Waste Acceptance Criteria*, Westinghouse Hanford Company, Richland, Washington.

WHC-EP-0137, *Best Available Technology Economically Achievable Guidance Document for the Hanford Site Waste Management Systems*, Westinghouse Hanford Company, Richland, Washington.

WHC-EP-0438, *A Guide for Preparing Hanford Facility Effluent Monitoring Plans*, Westinghouse Hanford Company, Richland, Washington.

WHC-EP-0498, *Unit Dose Calculation Methods and Summary of Facility Effluent Monitoring Plan Determinations*, Westinghouse Hanford Company, Richland, Washington.

WHC-IP-0628, *Facility Drill Guide*, Westinghouse Hanford Company, Richland, Washington.

WHC-IP-0836, *Order of Compliance Administration*, Westinghouse Hanford Company, Richland, Washington.

WHC-SP-0329, *400 Area Training Plans*, Westinghouse Hanford Company, Richland, Washington.

WHC-SP-0708, *Westinghouse Hanford Company Conduct of Operations Manual*, Westinghouse Hanford Company, Richland, Washington.

APPENDIX A:

HANFORD SITE DESCRIPTION

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A.1 WHC Managed Nuclear Facilities

This Appendix provides a listing of the existing and proposed nuclear facilities on the Hanford Site (see Table A.1-1) and provides a description of the Hanford Site Area (see Section A.2).

Table A.1-1 WHC-Managed nuclear facilities (2 sheets)*

Title of Nuclear Facility	Hanford Site Area
<u>Existing Facilities</u>	
242-A Evaporator	200 East
242-S,T Evaporators	200 West
Liquid Effluent Retention Facility	200 East
Single Shell Tank Farm	200 East and West
Double Shell Tank Farm	200 East and West
Central Waste Complex	200 West
Burial Grounds	200 West
Transuranic Storage and Assay Facility (TRUSAF)	200 West
213-W Compactor	200 West
T-Plant	200 West
340 Waste Handling Facility	200 East
N Reactor Complex	100 N
100 K Facility	100 K
N Reactor Fuel Supply Facility	300
Fast Flux Test Facility (FFTF) and Maintenance and Storage Facility (MASF)	400
GROUT	200 East
B-Plant/WESF Facility	200 East
Plutonium Finishing Plant (PFP)	200 West
PUREX	200 East
UO ₂ Facility	200 West
222 S Laboratory	200 West
308 Building	300
309 Building	300
377 Building, Geotechnical Engineering Building	300

Table A.1-1 WHC-Managed nuclear facilities (2 sheets)*

Title of Nuclear Facility	Hanford Site Area
Surplus Facilities	A11
Environmental Restoration Program	A11
<u>New Facilities</u>	
B-595, Hanford Waste Vitrification Plant	600
C-018H, 242-A Evaporator/PUREX Plant Condensate Treatment Facility	200 East
W-112, Enhanced Radioactive and Mixed Waste Storage Facility, Phase V	200 West
W-113, Solid Waste Retrieval Facility, Phase 1	200 West
W-026, Waste Receiving and Processing, Module 1	200 West
W-100, Waste Receiving and Processing, Module 2A	200 West
W-011H, Waste Sampling and Characterization Facility	600

*Environmental restoration and surplus facilities will be evaluated on a case-by-case basis. Does not include facilities currently under the auspices of EM-40.

APPENDIX A.2
HANFORD SITE CHARACTERISTICS

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LIST OF TERMS

ALARA	as low as reasonable achievable
BWIP	Basalt Waste Isolation Project
CAM	continuous air monitors
CDR	Conceptual Design Report
CH	contact-handled
CPC	Container Products Corporation
CWC	Central Waste Complex
D&D	decontamination and decommissioning
DCRTs	Double-Contained Receiver Tanks
Des	drum equivalents
DMF	Dry Materials Facility
DOE	U.S. Department of Energy
DSS	double-shell slurry
DSTs	Double-shell tanks
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ERRA	Environmental Restoration Remedial Actions
FDC	Functional Design Criteria
FEMP	facility effluent monitoring plans
FFTF	Fast-Flux Test Facility
FSAR	Final Safety Analysis Report
GDF	Grout Disposal Facility
GES	Ground Engineering System
GPF	Grout Processing Facility
GTF	Grout Treatment Facility
HCWC	Hanford Central Waste Complex
HDPE	high density polyethylene
HEPA	high-efficiency particulate air
HMS	Hanford Meteorological Station
HVAC	heating, ventilation, and air conditioning
HWVP	Hanford Waste Vitrification Plant
IEM	interim examination and maintenance
ISB	Interim Safety Basis
LCT	Liquid collection tank
LERF	Liquid Effluent Retention Facility
LFMW	Low-Flashpoint Mixed Waste
LLBG	Low-Level Burial Grounds
LWTC	Liquid Waste Tank Car
MASF	Maintenance and Storage Facility
MCS	monitor control system
msl	mean sea level
MT	Miscellaneous Treatment
MW	mixed wastes
NEPA	National Environmental Policy Act
non-TRU	nontransuranic
NRF	Neutron Radiography Facility
NRFS	N Reactor Fuel Supply

LIST OF TERMS (continued)

ORNL	Oak Ridge National Laboratory
OSR	operating safety requirements
PCB	polychlorinated biphenyl
PDR	preliminary design report
PFP	Plutonium Finishing Facility
PMF	probable maximum flood
PNL	Pacific Northwest Laboratories
PRCF	Plutonium Recycle Critical Facility
PRF	Plutonium Reclamation Facility
PRTR	Plutonium Recycle Test Reactor
PSE	Preliminary Safety Evaluation
PSF	Plutonium Storage Building Facility
PUREX	Plutonium-Uranium Extraction
PWSF	Purgewater Storage Facility
REDOX	reduction oxidation
RI/FS	remedial investigations/feasibility studies
RLWS	Radioactive Liquid Waste System
ROD	Record of Decision
RPS	Retention Process Sewer
SAR	safety analysis report
SNM	Special Nuclear Material
SST	single-shell tanks
Supply System	Washington Public Power Supply System
TRIGA	Test Reactor and Isotope Production General Atomics
TRU	transuranic
TRUEX	transuranium extraction
TRUSAF	Transuranic Storage and Assay Facility
TS	technical specification
UE&C	United Engineers and Constructors
UNH	uranyl nitrate hexahydrate
UO ₃	Uranium-Oxidation
USC&GS	U.S. Coast and Geodetic Survey
USQ	unresolved safety question
UST	underground storage tanks
UV	ultra-violet
WESF	Waste Encapsulation Sampling Facility
WIPP	Waste Isolation Pilot Plant
WMU	Waste Management Units
WRAP	Waste Receiving and Processing Facility
WSCF	Waste Sampling Characterization Facility
YFC	Yakima Firing Center

A.2.0 HANFORD SITE CHARACTERISTICS

Since the outset of industrial operations at the Hanford Site, scientists and engineers have systematically characterized important environmental parameters throughout the site and surrounding vicinity. This chapter is largely based on information taken from published data pertaining to site characteristics at the Hanford Site. Site characteristics data for specific Hanford Site nuclear facilities also are found in this chapter.

With the signing of the *Hanford Federal Facility Agreement and Consent Order* Ecology et al. (1990) (referred to as the Tri-Party Agreement) involving the U.S. Department of Energy (DOE), U.S. Environmental Protection Agency (EPA), and Washington State Department of Ecology (Ecology), Hanford Site's mission was transformed from that of national defense production to environmental cleanup and restoration.

A.2.1 GENERALIZED DESCRIPTION OF THE HANFORD SITE

A.2.1.1 Site Location

The Hanford Site is located in southeastern Washington State, within the Pasco Basin section of the Columbia Plateau. It is located at $\approx 117.5^\circ$ west longitude and 47.5° north latitude. The Hanford Site is a sprawling industrial facility situated within the boundaries of a 560 mi^2 ($1,450 \text{ km}^2$) tract of land owned by the U.S. Government and administered by the DOE (Figure A.2-1).

The Hanford Site is bounded on the north by the Saddle Mountains, on the east by the Columbia River, and on the south and west by the Yakima River and Rattlesnake Mountains respectively.

A.2.1.2 Site Description

It is estimated that buildings and other facilities constructed on the Hanford Site occupy $\approx 6\%$ of the total land area within its boundaries. Figure A.2-1 shows the six 100 Areas situated at the northern border of the site immediately adjacent to the Columbia River. All nine plutonium production reactors in the 100 Areas have been shutdown. The 400 Area is the location of the Fast-Flux Test Facility (FFTF) reactor. It was used for testing breeder reactor fuels, materials, and components. However, it is presently in a shutdown mode. Laboratories in the 300 Area are largely dedicated to nuclear research and development activities. Those activities involving fuel reprocessing/uranium separation; plutonium finishing; waste management, storage and disposal have historically been associated with Hanford's 200 East and 200 West Areas.

Access to the Hanford Site is controlled by the DOE through its various contractors and by a variety of leasing arrangements. The Hanford Site boundary can be seen in Figure A.2-1.

A.2.1.3 Population Distribution Around the Hanford Site

Figure A.2-2 shows the relative location and residential population of cities with a 50 mi (80 km) radius of the Hanford Meteorological Station (HMS). Figure A.2-3 shows the 1990 residential population in each of 80 sectors within a 50 mi radius of the HMS. Figure A.2-4, A.2-5, A.2-6 show 1990 residential population within a 50 mi radius of the 100-N, 300, and 400 Areas meteorological towers respectively.

A.2.1.4 Land and Waters Near the Hanford Site

The Hanford Site land use data, on which information in this section is based, are contained in *Disposal of Hanford Defense High-Level, Transuranic and Tank Wastes: Final Environmental Impact Statement* (DOE 1987). Land uses within a 5 mi (8 km) radius of the Hanford Site include: agricultural, industrial, recreational, commercial and residential. Land uses at the Hanford Site are managed under a multipurpose concept, effectively producing buffer zones for nuclear-related activities (Figure A.2-7).

A.2.1.5 Hanford Industrial Facilities

Major operating facilities on the Hanford Site are characteristically nonreactor nuclear facilities whose functions are usually associated with ongoing waste management and Site environmental remediation/restoration activities.

A.2.1.6 Nearby Transportation Facilities

Principal highways on and near the Hanford Site are shown in Figure A.2-1.

A.2.1.7 Nearby Military Facilities

The Yakima Firing Center (YFC) is located ≈ 6 mi (9.7 km) west of the Hanford Site. The U.S. Army administers this facility as a functional adjunct of Fort Lewis. It is presently used for troop maneuvers and heavy weapons training. Long range weaponry is fired from the periphery of the YFC toward an impact area located near the center of the facility. Because of this and other administrative controls, the U.S. Army contends that no threat to safety exists for individuals residing near the boundaries of the YFC or on the east bank of the Columbia River (DOA 1990).

A.2.1.8 Meteorology

Meteorological parameters have been measured in the vicinity of the Hanford Site since 1912. The HMS became operational in December of 1944. Since 1944, additional large scale meteorological monitoring towers have also been constructed in the 100, 300, and 400 Areas.

A.2.1.8.1 Regional Climatology. The climate at the Hanford Site can be characterized as mid-latitude semiarid (Supply System 1981). Summers tend to be warm, sunny, and dry. Winters are typically quite mild. During the winter, weather is subject to frequent change, as a consequence of Pacific Ocean storm systems moving rapidly inland. Extremely cold weather does occur occasionally at the Hanford Site when Arctic air masses sink southward out of Canada. Moreover, high winds are not uncommon at any time of the year. These winds can often be attributed to squall lines, strong pressure gradients, or thunderstorms.

A.2.1.8.2 Local Meteorology. The most common wind direction seen at the Hanford Site is southwesterly. Wind roses for the Hanford Site can be seen in Figure A.2-8.

Wind speeds are lower at the Hanford Site in winter, averaging 10 to 6.2 to 6.8 mph (11 km/h). Wind speeds are relatively higher in summer, averaging 8.7 to 9.9 mph (14 to 16 km/h). However, the fastest 50 ft (15.2 m) level peak wind ever recorded at the Hanford Site was 80.7 mph (130 km/h) on January 11, 1972 (Stone et al. 1983). Tornado winds are not now a considered a credible wind hazard for nonreactor nuclear facilities at the Hanford Site (Kennedy et al. 1990).

All minimum wind speeds established for facility design criteria at the Hanford Site are fastest-mile wind speeds observed at a height of 33 ft (10 m). The minimum wind speeds in questions have been established for straight reactor nuclear facilities located on the Hanford site. Minimum wind design criteria for Hanford Site nonreactor nuclear facilities are as follows: (1) Safety Class 3 (Important or Low Hazard) - 70 mph (112 km/h); (2) Safety Class 2 (Moderate Hazard) - 80 mph (129 km/h); (3) Safety Class 1 (High Hazard) - 90 mph (145 km/h) (Kennedy et al. 1990).

A Hanford Site design basis wind level has been established only for High Hazard (Safety Class 1) nonreactor structures, systems, and components. Their design will be in accordance with ANSI A58.1 (ANSI 1982) using 90 mph (145 km/h) as a design basis value. A Hanford Site design basis wind (i.e. 90 mph fastest-mile wind speed) has an annual exceedance probability of 1×10^{-4} (DOE-RL 1989).

The average maximum July temperature, the hottest month of the year at the Hanford Site, is 91.8° F (33.2° C). The average minimum in July is 61.0° F (16.1° C). Conversely, the coldest month of the year at the Hanford Site is January, for which the average maximum temperature is 36.6° F (2.6° C) and the average minimum temperature 21.9° F (-5.6° C). The daily temperature ranges $\approx 14.7^\circ\text{F}$ (8.2° C) in January and ranges 30.8° F (17.1° C) in July. The highest temperature ever recorded at the Hanford Site was 115° F (46° C) on July 27, 1939. Conversely, the lowest temperature ever recorded on the Hanford Site was -27° F. on December 12, 1991 (Stone et al. 1983).

The annual mean relative humidity at the Hanford Site is $\approx 54\%$. The highest relative humidity (80%) occurs in December, while the lowest relative humidity (32%) occurs in July. Mean annual precipitation at the Hanford Site is $\approx 6\text{in.}$ (15.2 cm), based on 80 yrs of historical data on rainfall. Annual

precipitation amounts have varied from a low of 3.3 in. (8.4 cm) to a high of 11.5 in. (29.2 cm). January is typically the wettest month at the Hanford Site, while July is the driest (Stone et al. 1983).

Total annual snowfall (this includes all types of frozen precipitation) has varied from a low of 0.31 in. (0.78 cm) to a high of 43.3 in. (110 cm). There is approximately a 30% probability that an accumulation of snow on the ground will exceed 6 in. (15.2 cm) during a given winter season (Figure A.2-9). The return period for a 27-in. (68.6-cm) accumulation of snow within a 24-hour period is calculated to be 1,000 years (Stone et al. 1983).

Design criteria for snow loads shall be in accordance with ANSI A58.1. In no instance shall the roofs of Hanford Site facilities be designed for less than a 20 lb/ft² snow loading (DOE-RL 1989).

Rime ice, supercooled moisture droplets that freeze on contact with solid objects such as intake and exhaust vents, is almost always seen in association with supercooled fog that is found at higher elevations in the nearby hills surrounding the Hanford Site and along the banks of the Columbia River (Stone et al. 1983).

A.2.1.8.3 Onsite Meteorological Measurement Program. The focal point of the Hanford Meteorological Monitoring Program is the HMS. The HMS is located between the 200 West and 200 East Areas, less than a mile northwest of Waste Sampling Characterization Facility (WSCF). Meteorological parameters measured at the HMS include: air temperature, relative humidity, precipitation, atmospheric pressure, solar radiation, cloud cover, visibility, wind speed and direction, and subsurface temperatures. Meteorological instrumentation and data collection methods at the HMS are discussed in *The Data Collection Component of the Hanford Meteorological Monitoring Program* (Glantz and Islam 1988).

A.2.1.8.4 Atmospheric dispersion. Atmospheric dispersion is a concept which incorporates the atmospheric variables of wind speed, atmospheric stability, and mixing depth. Atmospheric dispersion is more evident when winds are moderate to strong in velocity, when the atmosphere is unstably stratified, and when a deep mixing layer exists. Good atmospheric dispersion conditions are found on the Hanford Site $\approx$ 57% of the time during summer. Less favorable atmospheric dispersion conditions are found on the Hanford Site when winds are light and the mixing layer is shallow. Conditions such as these occur most frequently during the winter months when, $\approx$ 66% of the time, moderately to extremely stable stratification phenomena are observed. Unfavorable atmospheric dispersion conditions associated with temperature inversions and shallow mixing layers are frequently observed during all seasons of the year, especially within the period between sunset and approximately one hour after sunrise (DOE 1987).

There are occasional extended periods of poor atmospheric dispersion conditions at the Hanford Site. Such conditions are typically engendered by stagnate air found in association with stationary high-pressure systems (Stone et al. 1972).

Data pertaining to atmospheric dispersion conditions at the Hanford Site are important because accurate radiological dose calculations require that contaminant release rates be factored into a model of these atmospheric dispersion conditions (Glantz and Islam 1988).

A.2.1.9 Surface Hydrology

The Hanford Site is located within the Columbia River drainage basin. Surface hydrological features of the Hanford Site can be seen in Figure A.2-10. This figure shows the Columbia River, which is the principle surface hydrological feature on the Hanford Site. As can be seen in Figure A.2-10, the Columbia River transects the Saddle Mountains and enters the Pasco Basin at Sentinel Gap. It flows through the Hanford Site, forming the northern and eastern boundaries of public access to the site. The Yakima River enters the Columbia River less than 10 mi (16 km) south of the Hanford Site. The Snake River joins the Columbia ≈ 20 mi southeast of the Hanford Site. The Walla Walla River merges with the Columbia just before the Columbia River cuts through the Horse Heaven anticline and exits the Pasco Basin.

A.2.1.9.1 Hydrological Description. The average flow of the Columbia River near Priest Rapids Dam is $\approx 120,000 \text{ ft}^3/\text{sec}$ ($3,396 \text{ m}^3/\text{sec}$). The minimum discharge ever recorded at that location was $4,120 \text{ ft}^3/\text{sec}$ ($117 \text{ m}^3/\text{sec}$). This occurred in February of 1932, before the extensive network of dams was constructed on the Columbia River. Today, the minimum allowable discharge at points along the river is regulated by law. Minimum allowable discharges at the Hanford Site are sufficiently large as to not impact the functioning of raw water intake structures which supply much of Hanford's process and potable water.

A.2.1.9.2 Floods. While large scale flooding of the Columbia River at the Hanford Site has occurred in the past, the likelihood of such flooding is now remote because of an extensive network of upstream storage dams. The worst recorded historical flood, in June of 1894, produced a peak discharge near the Hanford Site of $742,000 \text{ ft}^3/\text{sec}$ ($20,999 \text{ m}^3/\text{sec}$).

As can be seen in Figure A.2-10, the Yakima River is physically separated from much of the Hanford Site by the Rattlesnake Hills. This fact essentially precludes major flooding of Hanford facilities by Yakima River flood waters.

There is no credible potential of significant flooding in the 200, 400, and 600 Areas from any nearby surface water body, including a probable maximum flood (PMF) of Upper Cold Creek. However, as seen in Figure A.2-11, a credible potential for flooding does exist in Hanford's 100 and 300 Areas (COE 1951).

A.2.1.9.3 Probable Maximum Flood on Streams and Rivers. A U.S. Army Corps of Engineers study has determined that a PMF of the Columbia River would likely produce, at the Hanford Site, a flow of $1.4 \times 10^6 \text{ ft}^3/\text{sec}$ ($4.1 \times 10^4 \text{ m}^3/\text{sec}$) (ERDA 1976 and DOE 1987). The PMF in question would produce maximum water levels at the Hanford Site of $\approx 390 \text{ ft}$ (119 m) above mean sea level (msl) (ERDA 1976). While the 100 and 300 Areas would be largely inundated by such a flood, the 200, 400, and 600 Areas would remain untouched. However, Skaggs and Walters, 1981 have postulated that a portion of 200 West Area would be

covered by a probable maximum flood of Cold Creek (Figure A.2-12). However, no existing or new 200 West Area facilities would be at risk from these flood waters.

A.2.1.9.4 Potential Dam Failures. An analysis of Grand Coulee Dam was carried out in 1951 by the U.S. Army Corps of Engineers to determine the conditions under which the dam's structural integrity might be breached. These studies also considered the hydrological consequences of a wide spectrum of natural phenomena, in addition to enemy (nuclear) attack (COE 1951). The worst credible event that could be postulated was a 50% breach of the dam (Figure A.2-11). It was estimated that a 50% breach of Grand Coulee Dam would result in a peak flow at the Hanford Site of $8.0 \times 10^6 \text{ ft}^3/\text{sec}$ ($2.26 \times 10^5 \text{ m}^3/\text{sec}$). The maximum river elevation at the Hanford Site resulting from a peak flow rate of the magnitude just described would be $\approx 486\text{ft}$ (129 m) above msl. This would largely inundate the 100 and 300 Areas, but would leave untouched the 200, 400, and 600 Areas.

The probability of a 50% breach of Grand Coulee caused by nuclear attack or nuclear terrorism, while doubtless very low, would be difficult to determine. However, it has been concluded that, by virtue of the fact that both Grand Coulee Dam and the Hanford Site are located in a region characterized by a Seismic Zone II designation (a zone of moderate earthquake activity that corresponds to a Modified Mercalli intensity of VII), the risk for seismically induced damage to the dam is only moderate (ERDA 1976).

A.2.1.9.5 Probable Maximum Surge and Seiche Flooding. The Hanford Site is not located near large lakes or other such bodies of water from which surge or seiche flooding could occur.

A.2.1.9.6 Probable Maximum Tsunami Flooding. The Hanford Site is not located near a body of water with the potential for producing tsunami flooding anywhere on the site.

A.2.1.9.7 Ice Flooding. The Hanford Site is not located near a body of water capable of generating ice flooding at the site. Ice flooding is a problem on the Yakima River, a few miles south of the Hanford Site. However, the Yakima River is at a sufficient distance from Hanford Site nuclear facilities so as not to constitute a credible ice flooding hazard to them (Figure A.2-10).

A.2.1.9.8 Water Canals and Reservoirs. There are presently no water canals or reservoirs on the Hanford Site (Figure A.2-10). Therefore, a consideration of the design basis capacity and PMF design capacity for reservoirs is not applicable. Similarly, a consideration of water canal design basis capacity, protection against wind waves and the ability to withstand surge, seiche, and ice flooding is not applicable.

A.2.1.9.9 Channel Diversions. A scenario in which the Columbia River was deemed to be partially blocked by a landslide has been analyzed. The scenario in question postulated a landslide within the White Bluffs area, located $\approx 6.2\text{mi}$ (10 km) upriver from the Old Hanford Townsite. Figure A.2-11 shows the location of the Old Hanford Townsite and its proximity to the Columbia River. The volume of this hypothetical landslide was assumed to be $2.8 \times 10^7 \text{ ft}^3$ ($8.0 \times 10^5 \text{ m}^3$). The postulated landslide was assumed to collapse into the Columbia River at a rate of $\approx 600,000 \text{ ft}^3/\text{sec}$ ($17,000 \text{ m}^3/\text{sec}$). The

resultant maximum wave crest was calculated to be ≈ 400 ft (122 m) above msl. Flooding would be extensive around the 100 Areas but would leave the 200, 300, and 400 Areas essentially unaffected (Cushing 1989).

A similar landslide scenario on the Yakima River would also not be likely to impact significantly the Hanford Site. This is because of the relatively long distances between the river and the nearest Hanford facilities (Figure A.2-1).

A.2.1.9.10 Flooding Protection Requirements. The flow of the Columbia River, both above and below the Hanford Reach, is thoroughly regulated by a system of hydroelectric dams. As such, significant flooding in the 100 and 300 Areas is deemed to be unlikely. Even more unlikely is Columbia River flooding in the 200, 400, or 600 Areas. In fact, Hanford Site design criteria (SDC-4.1) mandate no flood design requirements for Non-Safety Class 1 facilities (DOE-RL 1989).

A.2.1.9.11 Low Water Considerations. The historical Columbia River minimum discharge at the gauging station near Priest Rapids Dam was $4,120 \text{ ft}^3/\text{sec}$ ($117 \text{ m}^3/\text{sec}$). The minimum discharge ever recorded at McNary Dam was $39,000 \text{ ft}^3/\text{sec}$ ($897 \text{ m}^3/\text{sec}$).

Intake structures at river miles 342, 343, 344, 377, 379, 382, and 385 remove water from the Columbia River for use at the Hanford Site. These structures are designed and located at appropriate depths in the river so as not to be affected by low water levels of a magnitude and severity that could be reasonably expected to occur on this stretch of the river.

A.2.1.9.12 Chemical and Biological Composition of Adjacent Watercourses. That stretch of the Columbia River between Grand Coulee Dam and the river's mouth near Astoria, Oregon has been classified as Class A (excellent) by the Washington State Department of Ecology. The Hanford Reach of the river, starting below Priest Rapids Dam and terminating at the city of Richland, Washington (Figure A.2-10) constitutes the last unimpounded stretch of the Columbia River in the United States.

A rather large and diverse community of aquatic life is found in the Columbia River system including: phytoplankton, zooplankton, benthic invertebrates, fish and other aquatic communities. In the Hanford Reach of the Columbia River, the size and diversity of plankton populations is related to the size and diversity of plankton populations in the reservoirs behind upstream dams, particularly Priest Rapids Dam. Raising and lowering the reservoir levels of dams upstream of the Hanford Reach are typical mechanisms through which plankton populations are affected in this stretch of the Columbia. Thus, both zooplankton and phytoplankton are largely transient and move readily downstream from one reservoir to another. Indigenous populations of phytoplankton and zooplankton are not therefore common in the Hanford Reach because the rate of flow of the river does not provide sufficient time for their development.

A.2.1.10 Subsurface Hydrology.

This section focuses on the unconfined and confined aquifer systems beneath the Hanford Site. A more extensive treatment of the subsurface geohydrological system at Hanford can be found in *Final Environmental Impact Statement: Disposal of Hanford High-Level Transuranic and Tank Waste* (DOE 1987).

A.2.1.10.1 Regional and Area Characteristics. The unconfined aquifer beneath the Hanford Site portion of the Pasco Basin ranges from ≈ 345 ft (105 m) above msl at the Columbia River to ≈ 476 ft (145 m) at the western boundary of the site (Figure A.2-13). The maximum thickness of the saturated portion of the unconfined aquifer is ≈ 230 ft (70 m). Monitoring groundwater in the unconfined and confined aquifers beneath the Hanford Site is accomplished through a series of monitoring wells interspersed across the site. Groundwater in the unconfined aquifer is characterized by a slow rate of migration. Groundwater in the unconfined aquifer is being constantly replenished by a variety of sources including: Cold Creek, Dry Creek, B Pond and the Columbia River.

Confined aquifers beneath the Hanford Site occur in the uppermost basalt bedrock and flow typically from north to south.

A.2.1.10.2 Site Characteristics. The close hydraulic connection between the Columbia River and the unconfined aquifer is most apparent in the 100 Area where water levels in the unconfined aquifer manifest seasonal fluxuations closely correlated to river levels. The 100 Area is ≈ 420 ft (128 m) above msl and the underlying unconfined aquifer situated at ≈ 370 ft (113 m) above msl. The underlying aquifer is thus encountered at an approximate average depth of 50 ft (15 m) below the surface of the 100 Area. A groundwater mound has developed below the 100-N area as a result of liquid effluent discharges into the 1301-N ground disposal facility and trench and the 1325-N Basin. This mound can be expected to disappear within 1 to 2 yr after the discharges in question are halted (WHC 1989). There are no plans to use groundwater beneath the 100 Area as a potable or process water supply.

Beneath the 200 and 600 Areas, the unconfined aquifer is located among gravel deposits of the Middle Ringold Formation, at depths ranging between 180 ft (55 m) to 330 ft (100 m) below the surface. Generally, this groundwater flows downgradient from natural sources of recharge at the margins of the Pasco Basin and toward the Columbia River into which it discharges. Artificial recharge of the 200 and nearby 600 Area unconfined aquifer is as a consequence of waste water ground disposal. The present rate of artificial recharge has been estimated at $\approx 1.7 \times 10^7$ gal/d. The U Pond, B Pond, and Gable Mountain Pond have been significant sources of artificial recharge in the vicinity the 200 Area. However, U Pond and Gable Mountain Pond have been recently decommissioned.

A.2.1.10.3 Contaminant Transport Analysis. The unconfined aquifer beneath the Hanford Site is assumed to be vertically homogeneous and horizontally heterogeneous. This model of horizontal heterogeneity is based on observed variability in conductivity rates within the unconfined aquifer (Figure A.2-13). Conductivity differences are typically associated with

differences in the medium through which the groundwater flows, as well as the thickness of the unconfined aquifer through which it flows. Both parameters vary somewhat across the Hanford Site (DOE 1987).

A contaminant transport model of the vadose zone and unconfined aquifer beneath the Hanford Site is based on a stochastic-convection theory of transport which directly correlates dispersion to variation in the travel times among the sources which release contaminants to the accessible environment (Simmons et al. 1986). Thus, contaminant transport at the Hanford Site is modeled as an aggregation of multidimensional, though independent, groundwater pathlines. The model includes parameters of waste source and groundwater contaminant decay. It also uses the parameter of contaminant migration retardation, assuming a fixed equilibrium geochemical sorption rate unique to each individual radionuclide. The type of release model in question is represented analytically as a set of equations delineating the radionuclide fraction likely to be remaining at a given point in time.

The Hanford Site groundwater contaminant transport model was largely developed and validated by data from a program of groundwater monitoring, the design of which also satisfies requirements of WAC 173-303 (Ecology 1989), Sections 400 and 645 (Ecology 1989) and 40 CFR, Part 265. The location of groundwater monitoring wells at the Hanford Site can be seen in Figure A.2-14. When contaminated water reaches the unconfined aquifer, it is diluted and hydrodynamically dispersed by the flowing groundwater. It should be noted that the travel time of contaminants in the aquifer is relatively short when compared to the time they spend in the overlying unsaturated (vadose) zone. Consequently, concentrations are reduced as a result of physical and chemical mechanisms such as radiological decay, dilution, and chemical retardation.

A.2.1.11 Geology and Seismology.

The entire Hanford Site is located in the Pasco Basin which, in turn is a part of the Columbia Basin subprovince of the Columbia Intermontane Physiographic Province (Figure A.2-15). The province is characterized by the occurrence of a thick sequence of theolitic basalts varying in topographic expression and structure. The eastern Washington portion of the Columbia Intermontane Province is a region of low to moderate seismicity [U.S. Coast and Geodetic Survey (USC&GS) Zone 2] situated between the more seismically active western Washington and western Montana seismic zones (USC&GS Zone 3).

A.2.1.11.1 Basic Geologic and Seismic Information. A total of 6 physiographic sections comprise the Columbia Basin subprovince: Palouse Hills, Channeled Scabland, Waterville Plateau, Yakima Folds, North-Central Oregon Plateau, and the Central Plains. The Hanford Site is located in the Central Plains section of the Columbia Basin subprovince.

The Columbia Basin subprovince is the interior lowland portion of the Columbia Plateau. Major topographic relief forms include several east-to-southeast-trending ridges in the western portion of the subprovince. The Frenchmen Hills, Saddle Mountains, Horse Heaven Hills, Yakima Ridge, and the Umtanum Ridge are surface manifestations of the anticlinal folding of Tertiary Columbia River Basalt and associated sedimentary interbeds.

Beneath the Hanford Site are unconsolidated sands and gravels of a glacial fluvial sediment series known as the Pasco Gravels. Another of the facies, known as the Touchet Beds, is comprised of rhythmically bedded and fine-grained flood deposits. These two facies together comprise the Hanford Formation, which underlies the Hanford Site to a depth of as much as 230 ft (70 m) in the 200 Area. Beneath the Hanford Site Formation, and extending to a depth of more than 500 ft (152 m) below grade (in the 200 Area), is the Ringold Formation. It is comprised of consolidated and cemented silts, sands, clays, and gravels.

The Hanford Site is underlain by an assemblage of continental flood basalts. These basalts consist of a thick sequence of Miocene tholeiitic flows known collectively as the Columbia River Basalt Group. Isotopic analysis suggests that Columbia River Basalts were erupted during the period ≈ 17 to 6 million yr B.P. Magnetotelluric data seem to indicate the presence of basalt in most portions of Pasco Basin, including the Hanford Site. These basalts are found in thicknesses which can exceed 10,000 ft (3,050 m) (Berkman et al. 1986).

Most of the current seismicity around the Hanford Site seems to be concentrated between the Saddle Mountains and Frenchman Hills, as well as between the Saddle Mountains and Gable Mountain-Gable Butte area. Seismic activity is also seen along Rattlesnake-Wallula alignment (Figure A.2-16).

A.2.1.11.2 Vibratory Ground Motion. The USC&GS, based on an analysis of the regions seismic history since 1840, has designated Eastern Washington as Zone 2. This designation implies that there is a credible probability for moderate earthquake damage. This compares to Western Washington State and Western Montana, both of which are characterized as Zone 3. As mentioned in Section A.2.1.8.1 of this document, the principle sources of seismic exposures originate in the Saddle Mountains/Frenchman Hills, Saddle Mountains/Gable Mountain-Gable Butte Area and along the Rattlesnake-Wallula alignment (Figure A.2-16). Generally, sands and gravels beneath the Hanford Site attenuate the energy of an earthquake. This offers significant protection against severe damage. A seismic hazard curve for all Hanford Site Areas is presented in Figure A.2-17.

A.2.1.11.3 Surface Faulting. There is presently no evidence of surface faulting within the boundaries of the Hanford Site 100, 200, 300, or 400 Areas. However, capable surface faulting is evidenced on the Hanford Site. An example of capable surface faulting is seen at Gable Mountain-Gable Mountain Butte, immediately north of the 200 Area.

A.2.1.11.4 Stability of Subsurface Materials. Generally, soil characteristics at the Hanford Site are such that differential soil compaction or liquefaction during a seismic event is unlikely. Yet another reason for the negligible likelihood of seismically induced soil liquefaction are the rather large distances characteristically found between the foundations of Hanford nuclear facilities and the underlying water table.

A.2.1.11.5 Slope Stability. Facilities on the Hanford Site are typically sited in locations where there is no evidence of landslides. Because of the

Hanford Site's relatively flat terrain, there are virtually no slopes on the Site (manmade or natural) that would constitute a land slide hazard for Hanford nuclear facilities.

A.2.1.11.6 The Impact of Volcanism On Nuclear Facility Construction and Operating Requirements. Although the Hanford Site endured a moderate ash fall event as a consequence of the Mt. St. Helens volcano eruption of 1980, the event in question created no significant impact on Hanford Site operations, facilities or environment. Therefore, it is likely that no significant hazard to the construction or operation of Hanford Site nuclear facilities would be created by a volcanic event of similar type and magnitude.

Even so, ashfall is considered to be a credible hazard at the Hanford Site. consequently, all nonreactor nuclear facility Safety Class 1 structures, systems, and components must meet basic ashfall criteria. The design criterion for ashfall thickness is 4.5 in. uncompacted and 3.0 in. compacted. The design criterion for ashfall duration is 20 hours. The design criterion for the rate of ashfall deposition is 0.45 in./h over a period of 6 hours, with an average deposition rate of 0.15 in./h. The design criterion for a dry, compacted ashfall loading is 24 lb/ft². Criteria for ash densities are as follows: (1) 72 lb/ft³ for dry, loose ash; (2) 96 lb/ft³ dry, compacted ash; and (3) 101 lb/ft³ wet, compacted ash.

The ashfall loading described above shall be combined with snow loading for design purposes. Ashfall, in combination with snow, typically produces the highest design load. On the other hand, ashfall loading is not to be combined with earthquake loading for the purpose of design (DOE-RL 1989).

A.2.1.12 Hanford Site Ecology

The areas of the Hanford Site on which nuclear facilities are located have typically been used for nuclear-related purposes since 1943. As such, they are no longer in a pristine state, but have been altered and manipulated through landscaping, construction, and operational activities. The following discussion of Hanford Site Ecology is largely based on information contained in: *Final Environmental Impact Statement: Disposal of Hanford High-Level Transuranic Tank Waste* (DOE 1987).

A.2.1.12.1 Terrestrial Ecology. Before 1943, portions of the land on the Hanford Site were used for cultivation agriculture. However, most of the land on the Hanford Site is undeveloped, although most of it has been subjected to grazing by domestic animals before 1943. There have been no residential inhabitants within present Hanford Site boundaries since 1944.

The natural vegetation in and around the Hanford Site is dominated by desert shrubs (sagebrush, bitterbrush, and rabbitbrush) and spiny hopsage. The herbaceous understory on the Site is dominated by cheatgrass (an alien annual species from Eurasia) and small native bunchgrass. More than 240 species of plants have been identified on the Hanford Site.

The most prevalent terrestrial animal habitat on the Hanford Site is sagebrush-grass habitat. Game mammals residing on the Hanford Site include: mule deer, elk, cottontail rabbits and jackrabbits. Coyotes, badgers and

bobcats are also found on the site. The State of Washington has classified the pygmy rabbit, which is found on the Hanford Site, as a threatened species.

Resident small mammals include: the Great Basin pocket mouse, deer mouse, Townsend ground squirrel, pocket gopher, harvest mouse, house mouse, Norway Rat, sagebrush vole, grasshopper mouse, vagrant shrew, least chipmunk, and Merriam shrew. Muskrat, porcupine, and raccoon also have been observed on the Hanford Site.

The Hanford Site sagebrush-grass habitat also supports sage grouse, morning dove, chukar partridge, gray partridge, and pheasant. Hawks and owls seek refuge on the Hanford Site, especially during their nesting period. Moreover, the Hanford Reach of the Columbia River is an important resting place for migrating Pacific flyway waterfowl and shore birds. The peregrine falcon, a transitory visitor to the Hanford Site, is considered an endangered species by federal and state authorities. In addition, the state of Washington characterizes the Hanford Site's white pelicans and ferruginous hawks as a threatened species.

The Hanford Site supports more than 300 species of insects, 3 species of lizard, 5 species of snake, and 3 species of toads and frogs.

According to the Fish and Wildlife Service of the Department of the Interior, no threatened or endangered species appear to be negatively impacted by waste management activities being conducted on the Hanford Site (DOE 1987).

A.2.1.12.2 Aquatic Ecology. Aquatic habitats on the Hanford Site include ponds and ditches in and around the 200 and 600 Areas. Major aquatic environments on the Hanford Site also include 2 streams formed by springs west of the 200 Area; in addition to B Pond, Gable Mountain Pond, Westlake, and the Columbia River.

The Columbia River is by far the most important aquatic habitat found in association with the Hanford Site. Heated water and radionuclides in aqueous waste streams have been discharged into the river since 1943. In 1971, radionuclide burdens to the river and its biota were reduced dramatically following the closure of eight once-through coolant reactors. With the recent mission change at the Hanford Site, from plutonium production to environmental cleanup, the earlier practices of directly dumping heated or contaminated water into the river have been discontinued.

The Hanford Reach is home to ≈ 45 species of fish, some of which comprise a locally popular sport fishery. Anadromous fish found in the Hanford Reach include: chinook salmon, steelhead trout, coho salmon, sockeye salmon, and American shad. Resident game fish found in the Hanford Reach include: small-mouth bass, largemouth bass, mountain whitefish, sturgeon, walleye, yellow perch, black crappie, bluegill, channel catfish, and bullheads.

Many of the fish species in the Hanford Reach of the Columbia River also constitute a food base for nesting herons and terns. The carcasses of spawned salmon have been observed to provide food for bald eagles during the fall and winter months.

A.2.2 HANFORD SITE OPERATIONAL AREAS

The entire 579 mi² (1,500 km²) area of the Hanford Site, for reasons of security, public health and public safety, is a controlled area. This means that both employee access and public access are subject to a variety of controls, restrictions, and limitations. The Hanford Site operational areas have the following designations: the 600 Area, 100 Areas, 200 East and West Areas, 300 Area, 400 Area.

A.2.2.1 The 600 Area

A.2.2.1.1 Location and Description. The 600 Area encompasses 567 mi² (1,469 km²) and includes all of the land within the boundaries of the Hanford Site not otherwise occupied by the 100, 200, 300, or 400 Areas (Figure A.2-7). Land within the 600 Area is put to a variety of uses. These uses include the following.

- The Arid Lands Ecology Reserve is a 120 mi² (310 km²) tract of the Hanford Site which has been set aside in an undeveloped state for the purpose of ecological study and research.
- The state of Washington has leased 1.5 mi² (4 km²), a portion of which is used for the disposal of low level nuclear waste.
- The Washington Public Power Supply System has taken over 1.7 mi² (4.4 km²) of the Hanford Site 600 Area for the construction of three nuclear power plants, only one of which is now operating.
- The state of Washington has obtained 1.0 mi² (2.6 km²) of the Hanford Site 600 Area for potential use as a disposal site for nonradioactive hazardous waste.
- The U.S. Fish and Wildlife Service has obtained more than 50.2 mi² (130 km²) of the 600 Area for use as a fish and wildlife preserve.
- The Washington State Department of Game has obtained a revocable use permit to use 86.9 mi² (225 km²) of the 600 Area for recreational game management.
- The 600 Area is used as a the location for facilities such as the Yakima and Wye barricades, which support controlled access areas on the Hanford Site.
- The 600 Area of the Hanford Site also contains retired dry waste disposal sites and retired liquid waste disposal sites.

The 600 Area is the home of a large waste management project that has been totally curtailed. The Near-Surface Test Facility, within Gable Mountain, was part of the Basalt Waste Isolation Project (BWIP). Its mission was to assess the feasibility of disposing of radioactive waste in basalt formations. The principle borehole and exploratory shaft for the BWIP was located in the 600 Area, north of the 200 Areas.

There are active WHC-managed nuclear facilities presently located in the 600 Area. These include the following facilities: Liquid Effluent Retention Facility (LERF), Purgewater Storage Facility, Environmental Restoration Program (i.e., program-related facilities).

A new WHC-Managed nuclear facility will also be located in the 600 Area. The WSCF is the facility in question.

A.2.2.1.2 Facility System and Mission Descriptions (Existing or New Westinghouse Hanford Company-Managed Facilities In The 600 Area). The following descriptions of existing or new WHC-Managed facilities and their missions are contained in a Letter, J. M. Knoll, to R. D. Larson, "DOE Orders 5480.21, 5480.22, and 5480.23," (Knoll 1992).

A.2.2.1.2.1 Waste Sampling and Characterization Facility Project W-011H. The scope of Project W-011H is to design and construct the WSCF Complex. This includes a new analytical laboratory, a new radio-chemistry laboratory, an archiving facility, a computer facility, a mobile laboratory storage facility, and utility buildings. The facility will provide U.S. Department of Energy, Richland Operations Office (RL) the analytical capabilities to support Hanford Site activities subject to the following:

- *Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)*
- *Superfund Amendments and Reauthorization Act of 1986 (SARA)*
- *Resource Conservation and Recovery Act of 1976 (RCRA)*
- *Safe Drinking Water Act of 1974 (SWDA)*
- DOE orders.

Also, it will provide the capability to assure the quality of sample analysis by using "splits" and "blinds". Initially, analysis will be performed on radioactive samples of less than 10 mCi/hr and nonradioactive samples.

A.2.2.1.2.2 Purgewater Storage Facility (PWSF). The facility, consisting of two modular lined tanks (modules) is used for temporary storage and solar evaporation of well purgewater. The term "purgewater," refers to the water drawn from ground water monitoring wells for the CERCLA, RCRA, Hanford Site Monitoring, and Operational Groundwater Programs.

Each module consists of an inner primary and an outer secondary high density polyethylene (HDPE) liner separated with a geotextile drainage media, supported by metal walls and structural support. The drainage media will interconnect with a leak detection system consisting of a standpipe system with level measurement and sampling capability.

A.2.2.2 The 100 Areas

A.2.2.2.1 Location. The 100 Areas are all situated on the south shore of the Columbia River, in the portion of the Hanford Site where the river flows in an east-west direction (Figure A.2-1). The 100 Areas occupy a total land mass of 4.25 m² (11 km²). The 100 Areas are the location of nine retired plutonium production reactors. The six 100 Areas are dispersed along the Columbia River between river mile 345 and river mile 385.

Most of the present activity in the 100 Areas involves the decontamination and decommissioning (D&D) of old, surplus facilities. However, there are some ongoing activities in the 100 Areas that are not directly associated with D&D. For example, primary and back-up pumping stations for the 200 Area water supply system are located in the 100-B and the 100-D Areas, respectively.

Westinghouse Hanford Company - managed nuclear facilities located in the 100 Areas include the N Reactor Complex, 100-K Facility, Surplus Facilities, and Environmental Restoration Program-Related Facilities.

A.2.2.2.2 Description. These areas are situated in semiarid desert characterized by sagebrush, rabbitbrush, and desert grasses. The cheatgrass/tumble mustard vegetation is the predominant type of habitat within the 100 Areas. However, riparian vegetation (i.e., willows and reed canary grass) occurs along the banks of the Columbia River (WHC 1992a).

Industrial cooling requirements in the 100 Areas created some semi-permanent artificial ponds. The 100-D Ponds (Figure A.2-10) formerly received nonradioactive filtered backwash from the 183-D Facility. Such industrial releases have been terminated in the 100 Areas. Consequently, only one of the 100 Area ponds now contains standing water and associated riparian vegetation.

In 1991, 26 springs in the 100 Areas were sampled. Contaminants found in these samples were primarily tritium, ⁹⁰Sr, chromium, and nitrates. The maximum concentration of tritium observed in the samples was 24,000 pCi/L at 100-N. Maximum concentrations of ⁹⁰Sr (3,210 pCi/L) were also found in samples from 100-N. Chromium was found most highly concentrated (124 ppb) in springwater samples from the 100-D Area. The levels of ⁹⁹Tc (12 pCi/L) were found in springwater samples from near the 100-H Area. Technetium-99 also has been found in concentrations of 3,650 pCi/L in groundwater taken from the 100-H Area near the 183-H Basin. A uranium plume (maximum concentration 89 pCi/L) also was found in the 100-H Area (WHC 1992a).

Soils in the 100 Areas have been classified into several soil types. These soil types include: Ephrata Stony loam, Ephrata Sandy loam, Rupert sand, and riverwash. The topography of the 100 Areas is generally quite level. The surface soils in the 100 Areas are typically about 16 in. (40.6 cm) thick, but can extend to depths of as much as 30 in. (76.2 cm). Gravel content in 100 Area subsoils ranges from 20% to 80% by volume. Soil characterization studies in the 100 Areas indicate that they possess favorable engineering properties (WHC 1989).

Data pertaining to 100 Area meteorological parameters are gathered at the 100-N Meteorology Tower. Among those data collected at the tower are those

pertaining to the relative frequencies of various wind speeds, wind directions, and atmospheric stabilities. These data are used as a basis from which to calculate atmospheric dispersion (chi/Q) values. Chronic chi/Q values reflect atmospheric dispersion under postulated routine (nonaccident) conditions. Worst-case chi/Q values assume a postulated short-term accidental airborne release, with worst-case atmospheric conditions that would be exceeded only 5% of the time in a given year. Ground level chronic and 95% worst-case acute chi/Q values are shown in Table A.2-1 and A.2-2, respectively. Stack-level chronic and 95% worst case acute chi/Q values are shown in Table A.2-3 and A.2-4, respectively.

A.2.2.2.3 Individual 100 Area Descriptions. While much of the surface area in the 100 Areas has been altered by more than 40 yrs of industrial activities, they nevertheless contain natural, archeological, and historic resources worthy of note. Information on which the following subsection is based is contained in *Hanford Site National Environmental Policy Act (NEPA) Characterization* (Cushing 1992).

100-B and 100-C Areas--The 100-B Area Reactor has recently been designated as a National Mechanical Engineering Landmark, and is therefore listed on the National Register of Historic Places. There are other buildings in the 100-B and 100-C Areas originating in the Manhattan Project and early Cold War era Areas (Figure A.2-18), although their historical significance has not yet been determined.

100-D and 100-DR Areas--These Hanford areas are generally considered to be low in historical or archeological significance. Although there are numerous buildings in the 100-D and -DR Areas (Figure A.2-19) that were constructed in conjunction with the Manhattan Project, none are presently listed on the National Register of Historic Places. However, there is no record of any evaluation of structures has been carried out to determine their suitability for listing on this register. In any event, buildings within the 100-D and -DR Areas will be evaluated ultimately for National Register eligibility, as this is required before alteration or demolition of the buildings in question can be carried out.

100-F Area--The 100-F Area (Figure A.2-20) is located on a stretch of the Columbia River containing numerous historical and archeological sites. Four prehistoric archeological sites were found in the 100-F Area in 1991. Moreover, there are nine additional prehistoric archeological sites within a 1.2 mi (1.9 km) radius of the 100-F Area, one of which is listed in the National Register of Historic Places. There are two Manhattan Project era buildings on the 100-F site itself which have not yet been evaluated as to their suitability for listing on the National Register of Historic Places.

100-H Area--The 100-H Area (Figure A.2-21) is located in a very culturally and historically rich portion of the Hanford Site. There are 10 archeological sites within a 1.2 mi (1.9 km) radius of the 100-H Area, all of which are listed in the National Register of Historic Places. Historically significant sites in the vicinity of the 100-H Area are the old White Bluffs townsite, in addition to numerous homesteads founded in the early twentieth century. None of the homesteads have been evaluated as to their suitability for inclusion in the National Register of Historic Places.

100-K Area--Three archeological sites, located directly across the river from the 100-K Area (Figure A.2-22), have been nominated to the National Register of Historic Places. They were subsequently rejected because of insufficient supporting data. A recent (1991) archeological survey of the 100-K Area itself revealed 5 previously unknown archeological sites. An historic era Wanapum cemetery is located adjacent to the 100-K Area's K Trench.

100-N Area--The 100-N Area (Figure A.2-23) is located on an archeologically rich portion of Columbia River shoreline. There are eight archeological sites located within a 1.2 mi (1.9 km) radius of the 100-N Area. Four of these archeological sites are listed on or considered eligible for listing on the National Register of Historic Places.

Existing knowledge of 100-N Area archeological resources is largely based on archeological surveys that do not produce complete or definitive inventories. Because of previous inconclusive survey techniques, it is thought possible that undiscovered archeological sites still exist in and around the 100-N Area. Few traces of earlier historical era activities remain in and around the 100-N Area. Historical sites found near the 100-N Area consist of gold mining tailings found on the nearby river bank and old homestead sites scattered nearby.

A.2.2.2.4 Facility System and Mission Descriptions (Existing WHC-Managed Facilities In The 100 Areas). The following descriptions of existing WHC-managed facilities and their missions are contained in an Attachment to J. M. Knoll to R. D. Larson, "DOE Orders 5480.21, 5480.22, and 5480.23," (Knoll 1992).

A.2.2.2.4.1 N Reactor Complex. The recently issued DOE Order 5480.23, requires that up-to-date safety documentation be provided for each DOE nuclear facility and subsequent significant modifications, including decommissioning. This DOE order also requires that an upgrade plan be developed by each contractor to bring their facilities into compliance. Further, each nuclear facility must identify the interim controls and restrictions to be applied until the safety analysis report (SAR) and operating safety requirements (OSR)/technical specification (TS) can be upgraded to the new requirements. WHC has developed a procedure to standardize the identification of the interim controls and restrictions in a new document. This new document is identified in WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*, Chapter 8.0, "Interim Safety Basis." The intent of the Interim Safety Basis (ISB) is to document the SAFETY BASIS for each nuclear facility and the controls necessary to ensure that a facility can continue to function safely until the SAR and OSR/TS can be upgraded. An ISB will provide the information necessary to conclude that hazards are controlled and that the planned activities can be conducted safely.

This document provides the N Reactor Complex input to the overall WHC implementation plan for preparation of the ISB and the development of a functional unresolved safety question (USQ) program.

Facility Building Titles--The N Reactor Complex is composed of the following buildings. Office buildings and other buildings not related to the plant's former or current mission are not included.

The following are active and partially active buildings:

- 105-N Reactor Building
- 105-NB Maintenance Annex
- 107-N Basin Recirculation Facility
- 109-N Heat Exchanger Building
- 116-N Air Stack
- 117-N Air Filter Building
- 117-NVH Valve Control House
- 119-N Air Sampling Monitoring
- 143-N Carpenter Paint Shop
- 151-N 240 kV Electrical Substation
- 153-N Switch Gear Building
- 155-N BPA Switchyard
- 163-N Demineralization Plant
- 166-N Fuel Oil Storage
- 181-N River Pump House (N Reactor)
- 182-N High Lift Pump House
- 183-N Water Filter Plant
- 184-N Plant Service Power House
- 184-NA Auxiliary Power Annex Building
- 184-NB HVAC Main Building
- 184-NC HVAC Annex Building
- 1303-N Radioactive Dummy Burial Facility
- 1310-N Radioactive Chemical Waste Treatment
- 1312-N Liquid Waste Loadout Station
- 1313-N Change and Control Room
- 1314-N Liquid Waste Disposal Station
- 1315-N Diversion System Valve House
- 1316-N Valve House
- 1322-N Waste Treatment Pilot Plant Facility consisting of:
 - 1322-N (waste stream valve house)
 - 1322-NA (Waste Treatment Pilot Plant)
 - 1322 NB (Crib Effluent Iodine Sampling Building)
 - 1322 NC (Crib Sample Pump Pit)
- 1324-N Non-radioactive Waste Water Percolation Ponds
- 1325-N Crib (new)
- 1327-N Diversion Valve House
- 1705-N Plant Assistance Facility (Instrument and Electrical Facility)
- 1706-NA Motor Rewind Shop (Breaker)
- 1712-N Insulation Shop
- 1714-N Warehouse
- 1714-NA Receiving Inspection Facility
- 1716-NA Gas Station (possibly 1706-N)
- 1723-N Contaminated Equipment Storage Building.

The inactive buildings are listed as follows:

- 105-NA Lift Station Diesel
- 108-N Chemical Unloading Facility
- 109-NA Steam and Flow Building
- 109-NB HPU Building - Hydraulic Power Unit
- 181-NE River Pump House (Supply System)

- 185-N Turbine Generator Building (Supply System)
- 1300-N Radioactive Waste Disposal (Emergency Dump Basin)
- 1301-N Crib (old)
- 1304-N Emergency Dump Tank
- 1714-NB Tool Storage Shed
- 1715-N Diesel Oil Storage Tanks
- 1715-NA Underground Oil Tank 105-k gal
- 1722-N Decontamination Hot Shop Building
- 1908-N Seal Well (N Reactor)
- 1908-NE Seal Well (Supply System).

Facility Description--The N Reactor construction as a plutonium production reactor began in the late 1950's and was completed in 1963. The reactor achieved initial criticality on December 31, 1963 and operated in the plutonium production mode until 1966, when the Washington Public Power Supply System (Supply System) began producing electricity from N Reactor steam. The reactor was operated primarily for electricity production until 1982 when weapons-grade plutonium production resumed. The plant was shut down for safety upgrades on January 7, 1987 and placed on standby status in 1988. Fuel was discharged from the reactor beginning in November 1988 and completed in February 1989. Initially the reactor cooling systems were kept full of water but were drained in September 1990. A "dry layup" program was initiated in which warm, dehumidified air was circulated through the cooling systems. This was terminated in September 1991.

Discharged irradiated fuel was stored in the N fuel storage basin for initial cooling and was then moved to the 100-K Basins. Transfer was completed in January of 1990, and the N Basin was declared to contain less than a minimum critical mass of fissile material with the release of CSER 90-003 (WHC 1991). Unirradiated fuel was discharged separately from the irradiated fuel, decontaminated, and sent to the N Reactor Fuel Supply facility for storage. There is a residual inventory of radionuclides within the reactor core, on cooling systems piping and, at lower levels, in auxiliary work spaces and systems.

The reactor is currently defueled and laid away pending transition to a D&D status. No fuel, either irradiated or unirradiated, is stored at the facility. Current activities are centered around cleanup efforts and monitoring of still-active systems (e.g., the water plant and portions of the confinement system). The shutdown program is scheduled for a period beginning in fiscal year (FY) 1992 and extending through FY 1999. Before turning the facility over to D&D, the following activities are scheduled to be completed:

- Clean up and drain the fuel storage basin
- Remove all temporary radiation zones and stabilize the permanent zones
- Complete the facility effluent monitoring plans (FEMP) and closure plans for cribs and silo disposal facilities in accordance with Tri-Party Agreement commitments
- Shutdown N Reactor operating systems that are not needed after turnover to D&D.

A.2.2.2.4.2 100-K Facility. The recently issued DOE Order 5480.23 requires that up-to-date safety documentation be provided for each DOE facility and subsequent significant modifications, including decommissioning. This DOE order also requires that a upgrade plan be developed by each contractor to bring their facilities into compliance. Furthermore, each nuclear facility must identify the interim controls and restrictions to be applied until the SAR and OSR/TS can be upgraded to the new requirements. The WHC has developed a procedure to standardize the identification of the interim controls and restrictions in a new document. This new document is identified in WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*, Chapter 8.0, "Interim Safety Basis. The intent of the ISB for the 100-K Area Irradiated Fuel Storage Basins and supporting facilities is to provide assurance that these facilities can continue to operate safely under the safety authorization provided by the existing SAR and OSR. Updates to the current facility description, configuration and mission as described in the existing SAR are the primary upgrades required to satisfy ISB requirements. Some updates of administrative controls will also be required along with incorporation of the separately documented facility hazard classification.

This document provides the 100-K Area Irradiated Fuel Storage Basins and Supporting Facilities (K Basins) input to the overall WHC Implementation Plan for ISBs.

Facility Building Titles--The currently operating 100-K facilities consist of the two irradiated fuel storage basins (105-KE and 105-KW) and related support facilities. Following is a list of the active buildings/facilities at 100-K Area:

- 105-KE Fuel Storage Basin
- 105-KW Fuel Storage Basin
- 116-K3 1908 Outfall
- 151-K Switching Station
- 151-KE Substation 230-kV
- 151-KW Substation 230-kV
- 165-KE Power Control Building
- 165-KW Power Control Building
- 167-K Cross Tie Tunnel Building
- 181-KE River Pump Station
- 183-KE Head House/Chlorine Vault
- 183-KW Head House/Chlorine Vault
- 190-KE Main Pump House
- 1706-KE Environmental Laboratory
- 1717-KE Maintenance Shop Facility
- -- Yard equipment including a railroad track system and associated switches and deraillers used during the transport of fuel into and out of the 105-KE and 105-KW fuel storage basins.

Following is a list of the inactive buildings/facilities at 100-K Area:

- 105-KE Process Area
- 105-KW Process Area
- 107-KE Water Retention Basin
- 107-KW Water Retention Basin

- 115-KE Gas Recirculation
- 115-KW Gas Recirculation
- 116-K1 Emergency Crib
- 116-K2 .8 Mile Waste Trench
- 116-KE Reactor Stack
- 116-KW Reactor Stack
- 117-KE Exhaust Air Filter
- 117-KW Exhaust Air Filter
- 118-K Solid Waste Burial Ground
- 119-KE Exhaust Air Sample Building
- 119-KW Exhaust Air Sample Building
- 150-KE Heat Recovery Facility
- 150-KW Heat Recovery Facility
- 166-KE Oil Bunker
- 166-KW Oil Bunker
- 181-KW River Pump Station
- 182-K Emergency Water Pump House
- 190-KW Main Pump House
- 1614-K Monitoring Station
- 1713-KE Warehouse/Shop
- 1713-KW Warehouse/Shop.

Facility Description--The two K Area irradiated fuel storage basins, 105-KE and 105-KW, were built in the early 1950s. They were designed for the temporary storage of irradiated single pass reactor fuel from the respectively attached 105-KE and 105-KW reactors before irradiated fuel shipment to the Plutonium-Uranium Extraction (PUREX) Facility for processing. The 105-KE and 105-KW single pass production reactors ceased operation in 1971 and 1970, respectively.

The 105-KE Basin has been used for interim storage of N Reactor irradiated fuel assemblies since June 1975. The 105-KW Basin has been used for interim storage of N Reactor irradiated fuel assemblies since February 1981.

Operation of the PUREX Plant ceased before processing a backlog of irradiated N Reactor Fuel. Presently, $\approx 2,100$ MTU of irradiated N Reactor Fuel are stored in the two basins in about evenly divided quantities. A small quantity of unprocessed Hanford Site single pass reactor fuel is also stored in each of the two basins.

The facility includes other former 100-K Area auxiliary facilities required to support safe fuel storage. These include water pumping, treatment and discharge facilities, maintenance shops, electrical service facilities and office and laboratory space. The remaining presently unused 100-K Area facilities have been turned over to the Hanford Surplus Facilities Program awaiting the eventual D&D.

The current mission of the 105-KE and 105-KW fuel storage basins is the safe storage of irradiated fuel until such time as the fuel can be processed or transferred to a long term storage facility. A near term activity at the 105-KE Basin is the encapsulation of all fuel stored in the basin. The continuing operation of a water plant and other auxiliaries is necessary to support the operational 100-K Facilities. Thus, the present mission is

expected to last for up to 20 yrs. Disposition of the Hanford Site irradiated fuel inventories will be determined by the Environmental Impact Statement (EIS) process. This process is just being initiated. In addition, new facilities are expected to be required to implement the EIS record of decision.

A.2.2.3 200 Areas

A.2.2.3.1 Location. The 200 West and 200 East Areas are situated on a plateau. The 200 West Area (Figure A.2-24) is located ≈ 5 mi (8 km) south of the Columbia River. The 200 East Area (Figure A.2-25) is located ≈ 6.8 mi (11 km) south of the Columbia River (Figure A.2-10). For more than 40 yrs, these Hanford Site areas have been dedicated to fuel reprocessing, waste management, and waste disposal activities. The 200 West and 200 East Areas together encompass a land area of ≈ 6.2 mi² (16 km²). More than 40 yrs of industrial operations in this portion of the Hanford Site have resulted in large volumes of nuclear and hazardous wastes being stored there.

A.2.2.3.2 200 Area Nuclear Facilities. The following nuclear facilities are located in the 200 East and 200 West Areas:

- Single-Shell Tank Farms
- Double-Shell Tank Farms
- 242-A Evaporator
- 242-S, T Evaporators
- Central Waste Complex
- Burial Grounds
- Transuranic Storage and Assay Facility (TRUSAF)
- 213-W Compactor
- T-Plant
- Grout Treatment Facility
- B-Plant/Waste Encapsulation Sampling Facility (WESF)
- Plutonium Finishing Facility (PFP)
- PUREX
- Uranium-Oxidation (UO₃) Plant
- 222-S Laboratory
- Protective Equipment Decontamination Facility (Laundry)
- Environmental Restoration Program-Related Facilities
- Surplus Facilities.
- Liquid Effluent Retention Facility (LERF).

The following are new nonreactor nuclear facilities to be located in 200 East and 200 West Areas at some future date:

- Hanford Waste Vitrification Plant (HWVP)
- 242-A Evaporator/PUREX Plant Condensate Treatment Facility
- Enhanced Radioactive and Mixed Waste Storage Facility, Phase V
- Solid Waste Retrieval Facility, Phase 1
- Waste Receiving and Processing, Module 1
- Waste Receiving and Processing, Module 2A.

A.2.2.3.3 Description. Primary geologic units beneath the 200 Areas are, in ascending order: basement rocks, the Columbia River Basalt Group, and intercalated sediments. These sediments comprise the Ringold formation, Plio-Pleistocene unit, and the Hanford Formation. The surface soils of the 200 Areas are comprised of loess and sand dunes of various thicknesses (Cushing 1992).

The geologic units of greatest significance and importance are the same for 200 East and 200 West Area. However, there are differences, between 200 West and 200 East Areas in the occurrence, thickness and extent of some geohydrologic units. The degree of geohydrologic variance between the two areas is enough to create differential flows of groundwater beneath them.

The unconfined aquifer on the 200 Area Plateau is located within the Ringold Formation and overlying Hanford Formation, and ranges from 180 ft (54.9 m) to 310 ft (94.5 m) below the surface. The thickness of the unconfined aquifer beneath the 200 Areas ranges from less than 50 ft (15.2 m) to more than 200 ft (61 m).

Sources of natural recharge for this unconfined aquifer are rainfall from areas of high relief, situated west of the Hanford Site boundary, as well as Cold Creek and Dry Creek (Figure A.2-10). From recharge areas, the water flows downgradient and discharges ultimately into the Columbia River. This general process is modified by 200 Area basalt outcrops and subcrops, as well as by artificial recharge. The artificial recharge in question originates in waste water disposal areas. The disposal of cooling water in ponds has eventuated in the formation of groundwater mounds beneath 3 high-volume disposal sites: U Pond in 200 West Area; B Pond, immediately east of the 200 East Area boundary; Gable Mountain Pond, immediately north of the 200 East Area. The use of Gable Mountain Pond and U Pond has been discontinued so the groundwater mounds will attenuate over time. On the other hand, the elimination of Gable Mountain Pond has increased the volume of waste water disposed of through the B Pond system.

Soils and sediments under the 200 Areas are sometimes more than 400 ft (121.9 m) thick and overlay a basalt volcanic sequence which may be as much as 10,500 ft (3,200 m) in thickness. The overlaying sediments in question tend to be quite compact and, therefore, to possess a high loadbearing capacity. Moreover, the water table under the 200 Area is often more than 300 ft (91.4 m) below the surface. These factors essentially rule out a seismically induced liquefaction hazard for any of the facilities in the 200 Area.

Data pertaining to 200 Area meteorological parameters are gathered at the HMS, located between 200 East and 200 West Areas (Figure A.2-1). Among the data collected at the HMS are those pertaining to the relative frequencies of wind speeds, wind directions and atmospheric stabilities. These data are used to calculate atmospheric dispersion (χ/Q) values for the 200 Areas. Chronic χ/Q values reflect atmospheric dispersion under postulated routine (nonaccident) conditions. Worst-case χ/Q values assume a postulated short-term accidental airborne release, with worst-case atmospheric conditions that would be exceeded only 5% of the time in a given year. Ground level chronic and 95% worst-case acute ground level χ/Q values are shown in Table A.2-4 and A.2-5, respectively. Stack-level chronic and 95% worst-case acute χ/Q values are shown in Table A.2-6 and A.2-7, respectively.

All of the undeveloped portions of land in 200 East Area have been subjected to archeological study. Undeveloped portions of land in 200 West Area were subjected to a 50% random sample in order to ascertain the presence of archeological materials. Archeological studies of both the 200 Areas yielded negative results; no archeological sites of Native American origin were found within the boundaries of either Hanford Area. However, three small archeological sites have been found within a 1.2 mi (2 km) of the 200 Areas. Only the old White Bluffs freight road, which crosses diagonally through 200 West Area, has been evaluated for its value as an historical site. This road has been determined to be eligible for listing in the National Register of Historic Places. Consequently, a 328 ft (100 m) easement has been created to protect the road from uncontrolled disturbances. There are a number of buildings in 200 East and 200 West area which may be eligible for listing in the National Register of Historic Places. However, none of these buildings has yet been evaluated for National Register eligibility (Cushing 1992).

A.2.2.3.4 Facility System and Mission Descriptions (Existing WHC-Managed Facilities in the 200 Areas). The following descriptions of existing WHC-managed nuclear facilities and their missions are contained in an Attachment to J. M. Knoll to R. D. Larson, "DOE Orders 5480.21, 5480.22, and 5480.23," (Knoll 1992).

A.2.2.3.4.1 Tank Farms (Management System Includes The Following Six Nuclear Facilities). Tank Farms (Figure A.2-1 and A.2-28) are composed of 6 Nuclear Facilities: Single-Shell Tank Farms, Double-Shell Tank Farms, 242-A Evaporator, 242-S, T Evaporators, LERF, and Purgewater Storage Facility (located in 600 Area). A description of each facility is provided below.

A.2.2.3.4.1.1 Single-Shell Tank Farms. Between 1943 and 1964, 149 single-shell tanks (SST) were built to store radioactive waste solutions at the Hanford Site (Figure A.2-28). Of these, 133 tanks are 75 ft (22.8 m) in diameter with nominal capacities of 530,000 to 1,000,000 gal (2,006,262 to 3,785,400 L). Sixteen of the tanks are smaller units of a similar design with a 20-ft diameter and a 55,000-gal capacity. All 149 SSTs were removed from service (i.e., no longer authorized to receive waste) as November 21, 1980.

A Tank Farm--The A Tank Farm consists of six 1,000,000-gal tanks built during 1954-1955. The tanks are the fourth generation of SST design at the site with 31 ft (9.4 m) of operating depth and a flat bottom.

AX Tank Farm--The AX Tank Farm was the last set of SSTs built at the Hanford Site. Built during 1963-64, the four tanks have a 1,000,000-gal capacity. The design is similar to A Tank Farm with the addition of a grid of drainage slots under the steel liner bottom intended to provide a timely observation and collection of potential tank leakage.

B Tank Farm--The B Tank Farm was one of the first four tank farms built from 1943 to 1944. Twelve of the tanks are 75 ft (22.9 m) in diameter with capacities of 530,000 gal (2,006,262 L), and four are 20 ft (6.1 m) in diameter with capacities of 55,000 gal (208,197 m).

BX Tank Farm--The BX Tank Farm tanks were built from 1946 to 1947, using the original tank design for B Tank Farm. The 12 tanks were arranged in 4 cascades of 3 tanks each.

BY Tank Farm--The BY Tank Farm was built from 1948 to 1949, using a modified B Tank Farm design. The capacity of each of the 12 tanks is 750,000 gal (283,905 m), and the riser pattern is modified to gain more uniform access to the tank interior. The tanks were arranged in four cascades of three tanks each.

C Tank Farm--The C Tank Farm was one of the first four tank farms built from 1943 to 1944. Twelve of the tanks are 75 ft (22.9 m) in diameter with capacities of 530,000 gal (2,006,262 L), and four are 20 ft (6.1 m) in diameter with capacities of 55,000 gal (208,197 m). The 75-ft (22.9 m) diameter tanks are arranged in four cascades of three tanks each. The 20-ft (6.1-m) tanks were also used to settle waste.

241-T Tank Farm--The T Tank Farm was one of the first four tank farms built from 1943 to 1944. Twelve of the tanks are 75 ft (22.9 m) in diameter with capacities of 530,000 gal (2,006,262 L), and four are 20 ft (6.1 m) in diameter with 55,000-gal (208,197-m) capacities. The 75-ft diameter tanks are arranged in four cascades of three tanks each. Feed was pumped into the high tank and overflowed into the low tank.

241-TX Tank Farm--The TX Tank Farm was constructed from 1947 to 1948 using a modified B Farm design that consisted of 18 tanks with a 750,000-gal (2,839,050-L) capacity arranged in 3 cascades of 4 tanks each and 2 cascades of three tanks. Only half the tanks were used in cascade.

241-TY Tank Farm--The TY Tank Farm was built from 1951 to 1952. All six tanks have a 750,000-gal (2,839,050-L) capacity and are of the same design as the S Tank Farm. The TY Tank Farm tanks were used to settle and decant low-level wastes and were used as lag storage for the 242-T Evaporator feed. All six TY-Farm tanks are interim stabilized and interim isolated.

241-U Tank Farm--The U Tank Farm was built from 1943 to 1944. Twelve of the tanks are 75 ft (22.9 m) in diameter with capacities of 530,000 gal (2,006,262 L), and four are 20 ft (6.1 m) in diameter with capacities of 55,000 gal (208,197 L). The 75-ft (22.9 m) diameter tanks are arranged in four cascades of three tanks each; feed was pumped into the high tank and overflowed into the low tank. The 20 ft (6.1 m) diameter tanks also were used to settle waste.

241-S Tank Farm--The S Tank Farm was build in 1950-1951. Twelve, 750,000-gal (2,839,050-L) tanks were constructed to the second-generation tank design, similar to the original 75-ft (22.9 m) diameter tanks, but with an increased operating depth.

241-SX Tank Farm--The SX Tank Farm tanks were built during 1953-1954. These tanks represent a third generation of storage tank design, and each has a nominal capacity of 1,000,000 gal (3,785,400 L). They were the first tanks designed for self-boiling waste, and original construction included underground duct headers connected to a common condenser-ventilation system.

Double-Contained Receiver Tanks (DCRTs)

244-BX DCRT--The 244-BX Double-Contained Receiver Tanks (DCRTs) is a horizontal tank used in saltwell pumping in 241-B, -BX, and -BY Tank Farms.

244-U DCRT--This 26,000 gal, horizontal DCRT will be used in saltwell pumping from the U-Farm SSTs.

244-CR Vault--The vault is a reinforced concrete structure that houses two 40,000-gal (151,416 L) tanks (CR-011 and CR-001) and two 15,000-gal (56,781 L) tanks (CR-002 and CR-003). The CR-003 tank will be used as a saltwell waste receiver tank.

A.2.2.3.4.1.2 Double-Shell Tank Farms. Double-shell tanks (DSTs) have been used to store liquid radioactive waste [transuranic (TRU), high-level, low-level, and Hanford Site-facility waste] since 1971 (Figure A.2-28). Double-shell tanks have been used exclusively for receiving liquid waste since 1981, when single-shell tanks were retired from waste-receiving service. Several operating plants in the 200 East and 200 West areas of the Hanford Site transfer wastes from the facility through buried transfer lines to the 1,000,000 gal (3,785,400 L) underground DSTs. The liquid waste is accumulated in the DSTs until it can be processed at either the Grout Treatment Facility (GTF) or the HWVP.

The following is a list containing the buildings and facilities which comprise the DST Farm. It is made up of the 241-AN, -AP, -AW, -AY, and -AZ Tank Farms, which are used to store radioactive waste.

241-AW Tank Farm--The 241-AW Tank Farm contains six underground storage tanks. Each is designed to hold a nominal 1,160,000 gal (4,391,064 L) of waste. Tank 102-AW is the feed tank and tank 106-AW is the slurry receiver tank from the 242-A Evaporator.

241-AN Tank Farm--The seven, 1,160,000-gal (4,391,064-L) capacity tanks within the 241-AN Tank Farm are used primarily for storage of double-shell slurry (DSS) produced at the 242-A Evaporator.

241-AP Tank Farm--The 241-AP Tank Farm has been designed to operate in a manner similar to the 241-AW Tank Farm. Liquid wastes are transferred to or from the AP Tank Farm via 241-AW Tank Farm facilities. The eight 1,160,000-gal (4,391,064-L) capacity tanks within this facility store complexed and noncomplexed wastes.

241-SY Tank Farm--The 241-SY is a DST farm, containing three 1 Mgal tanks. This tank farm primarily takes the low-level liquid wastes from facilities in the 200 West Area.

241-AY/AZ Tank Farms--These tank farms each contain two 1 Mgal storage tanks. The differences between aging waste tanks and other double-shell storage tanks are the aging waste tank support systems. The aging waste tanks are equipped with condensers in the ventilation system, tank heating coils, and airlift circulators. These additional systems allow the tanks to receive and store high-heat generating waste with a minimum probability of integrity loss.

204-AR Waste Unloading Facility--The 204-AR Waste Unloading Facility serves as the rail car unloading facility. Liquid radioactive wastes from Hanford Site contractors are delivered to this facility by railroad tank cars. The facility also has been modified to receive waste from tanker trucks. If necessary, incoming wastes are adjusted chemically at this facility before being pumped to tank farm storage tanks.

244-AR Vault--The vault consists of a canyon building with three process cells and a failed equipment storage cell. Cells 1 and 2 each contain a 50,000-gal-capacity tank, while cell 3 contains two 5,000-gal (18,927 L) tanks. Waste transfers from B Plant to Tank Farms enters cell 3 and exits immediately thru a jumper. In addition to these, it includes a control room, a crane room, sample room, and change room.

Double-Contained Receiver Tanks (DCRTs)

244-A Lift Station--The 244-A lift station in 200 East Area is used in waste collection and transfer operations, but not as a primary salt well waste receiver.

244-S Double-Contained Receiver Tanks--The 244-S, DCRT, is a 20,000-gal (75,708 L) vertical tank located just east of the 241-S Tank Farm. It serves as an interim storage area for the following: West Area Laboratory (222-S) wastes, PFP (Z Plant) wastes, U Plant wastes, T Plant wastes, and cross-site transfers.

244-TX DCRT--This 26,000 gal (984,204 L), horizontal DCRT is used in saltwell pumping from T, TX, and TY Tank Farms, as well as receiving waste from PFP and T Plant.

2.2.3.4.1.3 242-A Evaporator-Crystallizer. The 242-A Evaporator facility (Figure A.2-28) is used to reduce the volume of waste solutions that do not self-boil, thereby reducing the number of underground DSTs required for waste storage.

The 242-A Evaporator Facility is composed of the following buildings:

- 242-A Evaporator
- 242-AB Control Room
- 242-A-81 Water Service Building
- 242-A-702 Evaporator Ventilation Building
- 207-A Steam Condensate Retention Basins.

The principal process components of the evaporator-crystallizer system are located in the 242-A Building, with supporting service and operating areas. The building comprises two adjoining but structurally independent structures, designated as A and B. Structure A, which houses processing and service areas (evaporator room; heating, ventilation, and air conditioning (HVAC) room; etc.), is a reinforced concrete shear wall and slab structure. Structure B of the 242-A Building, separated from structure A by a seismic joint, houses operating and personnel support areas (change rooms, lunchroom, etc.). The roof consists of metal decking supported by structural steel members spanning to reinforced concrete block walls.

The 242-AB Building is $\approx 1,700\text{ft}^2$ (157.9 m^2); it is north of and adjacent to the 242 A Evaporator-Crystallizer Building. The 242-AB Building is divided into an electrical room and a control room. The electrical room houses the air conditioning units, the uninterruptable power supply, and the power racks for the monitor control system (MCS). The control room houses the MCS and desk space for facility personnel.

A.2.2.3.4.1.4 242-S, T Evaporators. The 242-S, T Evaporator Facility is composed of the following buildings:

- 242-S Evaporator
- 242-T Evaporator
- 242-TA Vault
- 242-TB Filter Building.

The 242 S Evaporator-Crystallizer once performed the task of evaporating water off of tank wastes in order to reduce the volume of wastes having to be stored. The processing side of 242-S has been put on shutdown/standby Mode III and is not expected to be used again. The control room is used as an alarm center for the three tank farms within the S Complex.

The 242 T Evaporator Facility was originally operated as a batch process for concentrating waste. It is presently in Shutdown/Standby Condition V.

A.2.2.3.4.1.5 Liquid Effluent Retention Facility (LERF). The LERF provides RCRA permittable interim retention capacity for 242-A Evaporator process condensate until a treatment and disposal facility is operational. The interim retention capacity consists of three 6.5 Mgal surface impoundment retention basins. The basins have an active condensate retention volume of 19.5 Mgal; 13 Mgal for 242-A Evaporator process condensate; and 6.5 Mgal for contingency use. The depth of each basin ranges from 23.2 ft (7.1 m) at the shallowest point to 26.6 ft (8.1 m) at the deepest. At 4 ft (1.2 m) of freeboard, the basin depth ranges from 19.2 ft (5.9 m) to 22.6 ft (6.9 m). Each basin is equipped with cover level markings and liquid level instrumentation.

A.2.2.3.4.2 Central Waste Complex. The Central Waste Complex (CWC) is composed of the following buildings:

- 2401-W Storage
- 2402-W Storage
- 2402-W Storage
- 2402-WC Storage
- 2402-WD Storage
- 2402-WE Storage
- 2402-WF Storage
- 2402-WG Storage
- 2402-WH Storage
- 2402-WI Storage
- 2402-WJ Storage
- 2402-WK Storage
- 2402-WL Storage
- 2403-WA Storage
- 2403-WB Storage

- 2403-WC Storage
- 2403-WD Storage
- LFP 1 Storage
- LFP 2 Storage
- LFP 3 Storage
- LFP 4 Storage
- LFP 5 Storage
- LFP 6 Storage
- LFP 7 Storage
- LFP 8 Storage.

A.2.2.3.4.2.1 Facility Description. The CWC is a multi-facility complex, located in the 200 West Area of the Hanford Site. The CWC receives and stores most of the solid mixed wastes (MW) that are generated, received, and stored at the Hanford Site. The solid wastes that are handled at the CWC include both currently stored and newly generated contact-handled (CH), LLW, MW, and TRU/polychlorinated biphenyl (PCB) wastes.

The mission of the CWC is to provide facilities necessary for the Hanford Site to meet the DOE Order 5820.2A, *Radioactive Waste Management*, requirements and supplemental requirements of RL Order 5820.2A for handling radioactive waste, the RCRA requirements for handling hazardous waste, the WAC 173-303 requirements (Ecology 1991), and the *Toxic Substance Control Act of 1976* requirements.

The CWC is comprised of 17 storage buildings, 8 low-flashpoint modules, 2 pads, and support facilities. The CWC provides storage space for $\approx 266,000$ 55 gal (55,400,208 L) or equivalent waste containers. Facilities with physical features that provide for segregated storage areas are operated to maintain appropriate separation between arrays of incompatible waste.

The Plutonium/Polychlorinated Biphenyl Storage Facility (2401-W) was designed to meet all the requirements for PCB, hazardous, radioactive, or mixed type wastes. The storage facility is a pre-engineered steel structure 50 ft (15.2 m) wide by 80 ft (24.3 m) long with a clear span in the 50-ft (15.2-m) direction and an eave height of 20 ft (6.1 m). The 26-gauge metal structure has high rollup truck doors and 2 personnel doors. The foundation is integrated into a perimeter concrete curb 6 in. (15.2 cm) abovegrade. A ramp is provided to cross the curb at the truck door.

The Low-Flashpoint Mixed Waste (LFMW) Storage Modules 1 through 8 are designed to meet storage requirements for hazardous and radioactive (except flammable TRU) wastes. Two of the modules have been modified for TRU flammable waste. The modules are small pre-engineered buildings. They have exterior dimensions of 22 ft, 8 in. (6.7 m, 20.3 cm) by 9 ft (2.7 m) by 8 ft, 7 in. (2.4 m, 17.8 cm). The front, back, and side walls of all of the modules are constructed of 10-gauge steel coated with chemical-resistant epoxy paint inside or have a corrosion resistant covering. All the roofs are constructed of 12-gauge steel. Modules 1, 2, and 3 have fire-retardant plywood floors and ceilings within the metal skin. Modules 4 through 8 are metal construction. All modules have a 4 in. (10.1 cm) deep vented catch sump under the storage floor which provides spill containment and precludes spills from affecting other containers by keeping the storage deck clean.

The MW Storage Facility consists of an initial phase consisting of 12 identical storage buildings (2402-W and 2402-WB through 2402-WL). Adjacent to the buildings are two open air pads: an asphalt staging area and a concrete storage pad. The buildings were designed to meet the requirements for hazardous, mixed, and radioactive wastes. The storage buildings are each 4,000-ft² (371.6-m²) metal structures, ≈50ft (15.2 m) wide by 80 ft (24.4 m) long with a minimum clear span of 1,240 ft (380 m) and an eave height of ≈20ft (6.1 m).

The Waste Receiving and Staging Area is an asphalt pad ≈200ft (60.1 m) long and 150 ft (45.7 m) deep. The pad is used for handling and staging containers of radioactively contaminated waste destined for the various facilities. Components of the pad include an access for loaded trucks and other vehicles.

The MW Storage Pad is a 6 in. (15.2 cm) curbed 9,000 ft² (836 m²) concrete pad with an access ramp. The pad has a rainwater collection and removal system.

The latest phase of the MW Storage Facility consists of four large buildings (2403-WA through 2403-WD). Each storage building is planned and designed to contain four separate quadrants for managing various waste categories. Each building was designed to meet all the requirements for hazardous, mixed, and radioactive type wastes. Only compatible wastes will occupy any one zone at any one time.

Each building is steel-supported, sheet metal-covered structure with unobstructed clear height of no less than 17 ft (5.2 m) and roof slopes of 1 in 12. The structural system is modular beam and column rigid frame. Each rigid frame is supported by two interior columns, spaced at distances of one-third of the building's overall width. The roof and wall panels are 26-gauge steel sheets with exterior finish.

Each building is un-insulated with the exception of the heated sprinkler riser enclosure. The enclosure provides a heated space within which the sprinkler system riser may be housed and kept from freezing.

A.2.2.3.4.3 Burial Grounds. The Burial Ground facility is composed of the following burial grounds:

1. 200 East burial ground:
 - 218-E-10
 - 218-E-12B.
2. 200 West burial ground:
 - 218-W-3A
 - 218-W-3AE
 - 218-W-4B
 - 218-W-4C
 - 218-W-5
 - 218-W-6.

A.2.2.3.4.3.1 Facility Description. The Low-Level Burial Grounds (LLBG) are located in the 200 East and 200 West Areas of the Hanford Site. The LLBG are classified as a landfill and cover a total area of ≈ 518 acres (209.6 ha). The landfill is divided into eight burial grounds. Each burial ground is comprised of a number of trenches. Six burial grounds are located in the 200 West Area and two burial grounds are located in the 200 East Area.

The burial grounds consist of trenches that are linearly oriented excavations used for a variety of waste that have included, but not limited to, LLW in sealed fiberboard boxes, 55-gal drums, specially fabricated wood, metal, and reinforced concrete containers and both packaged and direct-buried failed equipment.

The mission of the LLBG is to dispose of nontransuranic (non-TRU) solid wastes (low-level radioactive waste) in approved burial sites/trenches and retrieve vented TRU drums. In addition, retrievable wastes are to be removed from the LLBG and sent to a treatment facility for further processing and disposition.

Before April 1970, all solid wastes, regardless of radionuclide content, were placed in trenches and covered with earth to prevent release of contamination. Since then, the DOE has required that radioactive solid wastes is to be segregated by categorizing as either TRU and placed in retrievable storage or non-TRU and placed in nonretrievable disposal sites. In 1985, steel drums of radioactive mixed waste were placed in retrievable storage trenches. In 1987, the mixed-waste burial was halted with the exception of the disposal of mixed-waste containers with a dose rate greater than 200 millirem/h at the container surface and special-case wastes such as Navy nuclear submarine reactor compartments.

A.2.2.3.4.4 Transuranic Storage and Assay Facility.

A.2.2.3.4.4.1 Facility Description. The TRUSAF (224-T) is located in the 200 West Area of the Hanford Site. The mission of TRUSAF is to provide a centralized storage unit to receive, inspect/characterize, store, and prepare offsite shipments of TRU and/or TRU mixed waste that meets the Hanford Site and Waste Isolation Pilot Plant (WIPP) waste acceptance criteria for disposal at the WIPP site at Carlsbad, New Mexico or another approved disposal site. The TRUSAF also stores ≈ 40 drums of retrieved TRU and/or TRU mixed waste for characterization and reprocessing in a future Waste Receiving and Processing Facility (WRAP).

The 224-T Building was originally constructed for purifying plutonium. It was idle for several years after new processes made it obsolete. The 224-T Building was modified to meet requirements for the storage of plutonium bearing scrap and liquids. The cells in the processing areas have been completely sealed and isolated from the operating gallery and service areas. These operating and services areas have been stripped of all unnecessary control equipment, panel boards, and partitions to provide $\approx 11,500 \text{ ft}^2$ ($1,068 \text{ m}^2$) of storage space on three floors.

The 224-T Building is $\approx 197 \text{ ft}$ (60 m) long and 60 ft (18.3 m) wide. The modified building is constructed of reinforced concrete walls, floor, and ceiling.

The three floors of the building used for TRUSAF are completely sealed from the southeast third of the building which contains the six contaminated process cells. The floors are connected by stairway A at the north end of the building, by stairway B at the south end of the building, and by an elevator adjacent to stairway A. There also is an unloading platform off the elevator on the outside of the building.

The storage area on the first floor is located in the former gallery area associated with A through E cells. This area contains a toilet, change room, mechanical room, and space for storage. The storage area on the first floor is in an open area with arrays marked off or painted on the floor.

The storage area on the second floor is located in the former gallery area associated with A through F cells. The individual process cell sample galleries, which protrude into this area but are not part of the storage area, are sealed off. Storage on the second floor is in an open area, with arrays marked on the floor.

The storage area on the third floor is located in the former operating gallery area associated with cells A through E.

Constant air monitoring of operating and storage areas on each of the 3 floors is provided by continuous air monitors (CAMs). The building HVAC system provides for contamination zone control in facility operating floor areas.

A.2.2.3.4.5 213-W Compactor.

A.2.2.3.4.5.1 Facility Description. The Waste Compactor Building is a 853-ft² (79.2-m²), pre-engineered structure located in 200 West Area, near the low level burial ground of the Hanford Site. The mission of the Compactor Facility is primarily centered around waste minimization and size reduction with service presently provided to the 222-S Chemical Laboratory and B Plant. Other onsite facilities are seeking approval to send compactible waste to this facility.

The Waste Compactor Building is 42 ft, 8 in. (12.8 m, 20.3 cm) long by 20 ft (6.1 m) wide and is partitioned into three rooms; an 8-ft (2.4 m) long personnel entry room, a 20-ft, 8-in. (6.1 m, 20.3 cm) long compactor room, and a 14-ft (4.3 m) long package inspection room. The personnel entry room opens into the compactor room through an airlock. Vehicle doors permit forklift transportation from the compactor room into the package inspection room and from the package inspection room to the building exterior. An electrical interlock prevents operation of the compactor with both vehicle doors opened at the same time. All three rooms have a personnel door that opens to the outside.

The compactor is a Container Products Corporation (CPC) Model B60. This compactor provides a compaction force of 60,000 lb (27.2 kg) and compaction speed of 78 in./min (198.1 cm/min). The unit measures 180 in. (457.2 cm) high, 106 in. (269.2 cm) long, and 96 in. (243.8 cm) wide, and weighs 11,500 lb (5,216.4 kg). Power is provided by a 15 hp motor operated on 3-phase, 480 volt current. Material is fed into the compactor through an

upper door, and compacted scrap containers are removed through a lower door. Safety interlocks are provided on both doors to prevent the compactor from operating while the doors are open.

The LLW material is compacted directly into 47 in. (119.4 cm) wide by 78 in. (198.1 cm) long by 52 in. (132.1 cm) high steel burial boxes. The boxes have a capacity of $\approx 90\text{ft}^3$ (2.5 m^3), are constructed of 14-gauge steel, and have a net weight of 445 lb (201.9 kg). Hydraulic cylinders partially eject the boxes from the compactor so they can be retrieved by a forklift truck.

The compactor control panel is located on a panel behind the doors of the compactor. A two-handed safety push button control is provided for ram up, ram down, and container eject. Controls are provided for hydraulic start/stop operations and ready lights or status lights for door, ram, eject, and exhaust.

The exhaust system consists of a primary fan, two high-efficiency particulate air (HEPA) filters in series and a stand-by HEPA filter. Dampers are installed on both filter enclosures so each can be isolated. Backdraft dampers function on the upstream sides. The ductwork connects the outlet sides of the two filter systems, and parallel outlet ducts go to each of two separate fans both connected to a common stack.

A.2.2.3.4.6 T Plant.

A.2.2.3.4.6.1 Facility Building Titles. The T Plant Complex is composed of the following buildings:

- 211-T Chemical Storage
- 214-T Chemical Storage
- 221-T Decontamination Facility
- 221-TA Fan House
- 221-TB Laundry Storage
- 2706-T Low Level Decontamination
- 271-T Office
- 2715-T Maintenance Shop
- 2716-T Storage
- 277-T Storage
- 291-T HEPA Filter and Stack
- 292-T Fission Product Release Laboratory
- M0-371 Womens Change Trailer
- M0-739 Change Trailer.

A.2.2.3.4.6.2 Facility Description. The original buildings at T Plant were constructed in the mid-1940's to extract plutonium from production reactor fuel. The plant continued to perform this function until it was deactivated in 1956. Most of its original process equipment subsequently was removed. In 1957 T Plant was placed in service as a beta-gamma decontamination facility and as a support complex for experiments and other operations requiring containment or isolation. It currently functions primarily as a decontamination facility.

The T Plant Complex (excluding 224-T TRUSAF), located in the 200 West Area, primary mission is the decontamination and repair/disposal of contaminated large equipment and the transfer of liquid waste generated during the decontamination activities.

The T Plant provides a method for decontamination of low-level (at the 2706-T Facility) and high-level (at the 221-T Canyon) contaminated equipment decontamination, testing, and repair/disposal services. These services are essential for tank farm operations, well drilling/monitoring operations, and the compliant decontamination/treatment and repair/disposal of equipment contaminated with hazardous constituents as defined by WAC-173-303 (Ecology 1992). Decontamination of site equipment for repair/disposal, reduces replacement/disposal costs, which contributes to waste minimization, conserves natural resources, reduces the volumes and cost associated with packaging and disposal of radioactive and mixed wastes, reduces personnel radiation exposure, and reduces the area required to store contaminated equipment. The T Plant facilities also provide space for the Liquid Waste Tank Car (LWTC) Certification and running gear maintenance, fabrication of area stack monitor cabinets, and maintenance of environmental monitoring equipment. The major programmatic objectives will continue to be the safety modifications and the legacy waste cleanup. Efforts will continue to resume low-level decontamination in order to fulfill other Hanford Site programmatic needs and reduce the significant backlog associated with contaminated equipment.

The T Plant Facility consists of two primary decontamination buildings, 221-T and 2706-T. Building 221-T was built during 1943 to 1944. Building 221-T provides services in radioactive decontamination, maintenance, and return-to-service, and decommissioning of process equipment decontaminated with fission products and other highly contaminated pieces of equipment. The 2706-T Building was built during 1959 to 1960. Building 2706-T was constructed as a low-level radioactive decontamination facility and is used to decontaminate railroad equipment, buses, trucks, automobiles, road-building equipment, and plant process equipment. The following are specific descriptions of the main facilities of the T Plant Complex.

221-T Canyon--Decontamination operations in this facility currently are curtailed, pending increased staffing, funding, and general upgrades completion to the T Plant Complex. Normal operations consist of decontamination and repair services for Hanford Site equipment containing high activity contamination. Decontamination is accomplished using such processes as high pressure wash, vibratory polishing, acid bath, and sand blasting. Decontaminated equipment is then returned to service or prepared for burial. A modification to the Part A interim status permit has been drafted to include >90 day storage of solid and liquid waste and decontamination services (treatment) for Hanford Site equipment that has been designated as waste. This area maintains a negative differential pressure and discharges air via exhausters, HEPA filtration and monitored stacks.

Currently the canyon deck and several cells are used for the storage of contaminated process equipment (including: pumps, jumpers, towers,). Other cells contain the tanks for the storage, treatment, and transfer of the

T Plant liquid waste stream. One cell has been converted to house the pool for the pressurized water (cooled) reactor (PWR) Core II spent fuel element storage and the associated ion exchange column.

221-T Tunnel--This area is the entrance via railcar to the 221-T Canyon. The tunnel provides the area for LWTC certification, repair, and decontamination. This area is maintained at a negative differential pressure and discharges air via the canyon exhausters, HEPA filtration and monitored stack. The tunnel also provides for delivery and removal of equipment and waste from the 221-T Canyon. Final disposition of the PWR Core II Spent Fuel Elements will require this area to be operational.

211-T Area--The 211-T Area contains the piping, tanks, and instrumentation for storage and monitoring of liquid chemicals (sodium hydroxide) used in the 221-T decontamination processes. A <90 day site accumulation area for plant maintenance waste is also located in this area.

This area contains four emptied, out-of-service chemical storage tanks, one of which is radiologically contaminated. These tanks will be removed pending funding authorization.

214-T Chemical Storage Building--Provides for safe storage of bulk chemicals used in the decontamination and maintenance areas.

2706-T Low-Level Decontamination Facility--This facility is undergoing construction activities as part of the productivity line item. Upgrades to this area included the addition of a system to give negative differential pressure and discharge via exhausters, HEPA filtration and a monitored stack. Also included were upgrades to the electrical system, crane, (installation of) fire suppression system, and floor grating. Normal operations consist of decontamination and repair services for Hanford Site equipment containing low activity and mixed contamination. Decontamination processes can consists of high pressure wash, vibratory polishing, and sand blasting. Decontaminated equipment is then returned to service. A modification to the Part A interim status permit has been drafted to include >90 day storage of liquid waste and decontamination services (treatment) for Hanford Site equipment that has been designate as waste.

Specifically, this facility provides decontamination/repair for site rolling stock, cranes, drilling rigs, trucks, tankers, masks, and gas cylinder bottles. Fabrication and repair for Hanford Site stack CAM's and area monitors is performed in this location. Operation of this facility is critical to the restoration of the Hanford Site.

A.2.2.3.4.7 Grout Treatment Facility.

A.2.2.3.4.7.1 Facility Title and Buildings. The GTF is composed of the following buildings:

1. Grout Processing Facility (243-G)

- MO-392 Changerooms, office space, and storage
- MO-041 Visitor/office facility
- 243-G4 Process control room

- 243-G5 Standby generator
- 243-G1 Liquid collection tank/mixer module
- 243-G2 Dry-blend system
- 243-G3 Decontamination module
- 243-G8 Air filtration module
- 243-G6 Electrical control room
- 243-G9 Electrical substation
- 241-AP-02D Waste pump pit and transfer piping.

2. Grout Disposal Facility

- Grout Disposal Vaults Concrete vaults used for permanent disposal of grouted waste
- PIH Portable instrument house
- Ventilation Exhauster Portable exhauster placed on Grout vault during filling and removed during closure.

3. Dry Materials Facility (2400-E)

- 2402-EA Railcar unloading
- 2402-ED Pottery clay storage bin
- 2402-EF Attapulgate clay storage bin
- 2402-EB Portland cement storage bin
- 2404-E Compressor room
- 2400-E Control room
- MO-386 Changeroom and offices
- 2403-EA Compressor building
- 2403-E Truck loadout and blending bin.

A.2.2.3.4.7.2 Facility Description. The GTF is a waste management unit located within the 200 East Area of the Hanford Site. The facility treats liquid low-level mixed waste by combining it with grout-forming solids. The GTF contains three separate and distinct processing units not including the waste feed tank(s) located in the AP Tank Farm. The Dry Materials Facility (DMF) prepares mixtures of grout-forming solids that are then transported to the Grout Processing Facility (GPF) Here the grout-forming solids are mixed with liquid mixed waste by an in-line mixer. The process produces a slurry that is then pumped to the Grout Disposal Facility (GDF). The vaults are operated as a near surface impoundment while the grout waste slurry hardens. When the waste slurry hardens, the vaults are sealed and closed as a landfill.

The GTF is designed to treat $\approx 70,000$ gal (264,978 L) of waste per day. A vault has a minimum design capacity of a 1.47 Mgal of grouted waste slurry. The disposal of current and projected inventories of double-shell tank waste may take ≈ 25 years to complete. During this period, ≈ 43 disposal vaults will be constructed, filled, and closed. A maximum of four vaults will be filled each year.

An amended Part A dangerous waste permit application was filed in May 1988 to identify the GTF as an existing dangerous waste treatment, storage, and disposal facility. Construction of the GTF was completed in

June 1988. The GTF began operations to treat and dispose of nonhazardous radioactive liquid waste in August 1988, and treatment and disposal of mixed-liquid waste is scheduled to start in October 1993.

The GTF comprises the following facilities described in the following sections:

- The 241-AP-02D waste pump pit and transfer piping
- DMF
- GPF
- GDV.

241-AP-02D Waste Pump Pit and Transfer Piping--Liquid wastes processed at the GTF are received and mixed, if required, in the GTF waste feed tank 241-AP-102 before each campaign. Waste feed tank 241-AP-102 is a 1.1 Mgal underground storage tank located west of the GPF in the 241-AP Tank Farm. The waste is pumped from the waste feed tank (which is managed by Tank Farms) using a deep-well turbine pump housed within the 241-AP-02D pump pit located above the eastern quadrant of the tank. The waste feed is pumped through a 2-in. (5.1 cm) carbon steel pipe to the GPF. This pipe is encased within a secondary 4-in. (10.2 cm) carbon steel pipe to provide containment of any leak in the primary piping and is equipped with leak detection at the drain points. This transfer pipe is located below ground or within an earthen berm and has radiation signs posted along its entire length for identification.

Dry Materials Facility--The DMF receives bulk materials by either rail or truck, stores the materials in dedicated bins, blends up to four of these materials into a homogenous mixture, and loads the blended material into trucks for shipment to the GPF. Provisions are made for sampling and weighing the material at various steps in the process. This facility includes storage bins, conveying systems, and the related ancillary equipment necessary to the operation. The nominal production rate of the DMF is 24,000 lb/h (12 ton/h).

Grout Processing Facility--The GPF mixes the dry-blended solids and the liquid waste feed to form the grout slurry. The GPF consists of various units performing the following functions:

- Dry-blend system--dry materials receiving, storage, and feeding
- Decontamination and additives module--equipment decontamination, storage and dispensing of treatment additives, and process air supply
- Liquid collection tank (LCT)/mixer module--flush solution and excess-water collection and sampling, grout production (dry-blend material and liquid feed mixing), and pumping
- Air-filtration module--makeup air and process ventilation
- Control room--process control and monitoring
- Electrical equipment--motor control and miscellaneous electrical equipment

- Substation--normal power distribution
- Standby generator--standby power for GPF safe shutdown.

Grout Disposal Vaults--Double-shell tank waste contains dangerous components that are subject to regulation under the RCRA, as amended, and the *State of Washington Hazardous Waste Management Act of 1976*, as amended. Regulatory guidelines have been observed in designing the disposal system. Although the implemented design differs significantly in appearance from conventional landfills and surface impoundments, the design is intended to meet all requirements for dangerous waste disposal. Design enhancements and modifications were necessary to handle the additional hazards associated with radioactive wastes.

A.2.2.3.4.8 B-Plant/Waste Encapsulation and Storage Facility.

A.2.2.3.4.8.1 Facility Building Titles. The B Plant/WESF is composed of the following buildings:

- 207-B Retention Basin
- 207-BA CBC Sampling Building
- 211-B Chemical Tank Farms
- 211-BA Chemical Sewer Neutralization Building
- 212-B Cask Transfer Station
- 216-B Cribs
- 217-B Demineralizer Building
- 218-B Emergency Equipment Storage Shed
- 219-B Emergency Equipment Storage Shed
- 221-B B Plant Canyon
- 221-BA 15 in. Sewer Monitor Facility
- 221-BB Condensate Building
- 221-BC SWP Change House
- 221-BD Laundry Storage
- 221-BE Fork Lift Station
- 221-BF BCP Storage Pit
- 221-BG 24 in. Sewer Monitor Facility
- 224-B Concentration Facility
- 225-B Waste Encapsulation and Storage Facility (WESF)
- 225-BA K-1 Filter Building
- 225-BB 225 B Filter Pit
- 225-BC Compressor Building
- 225-BD Sample House
- 225-BE 225 B Repair Shop
- 225-BF Utility Building
- 226-B Hazardous Waste Storage Area Emergency Equipment
- 271-B B Plant Support Building
- 271-BA Laundry Shed
- 2711-B Breathing Air Compressor
- 2711-BA Breathing Air Compressor WESF
- 2712-B Electrical Instrument Building
- 2715-B Paint and Oil Storage Building
- 2716-B Laundry Storage - RR Tunnel
- 272-B Electrical Shop

- 272-BA Maintenance and Material Storage Building
- 272-BB Insulation Shop
- 2724-B Radiation Monitor and Clothing Storage
- 276-B Organic Make-up
- 282-B Emergency Water Pump House (South)
- 282-BA Emergency Water Pump House (North)
- 2902-B Emergency Sanitary Water Supply Tank
- 2904-EA Chemical Sewer Sample Building
- 291-B Main Stack/Sand Filter/Turbine Building
- 291-BA Exhaust Air Sample House
- 291-BB Instrument Building - A and B Filters
- 291-BC A and B Filters
- 291-BD C Filter and Instrument Building
- 291-BE WESF Stack
- 291-BF D Filter
- 291-BG Instrument Building
- 291-BH E Filter
- 291-BJ F Filter
- 292-B Stack Monitor Station
- 292-BG E Filter Instrument Building
- 294-B Backflow Preventer Building
- MO-863 Office Area
- MO-029 Office Area
- MO-232 Office Area
- MO-400 Office Area
- MO-408 Office Area
- MO-410 Office Area
- MO-995 Office Area.

A.2.2.3.4.8.2 Facility Description. A primary waste management goal for high-level radioactive waste from nuclear fuel reprocessing was the removal and long term isolation of this waste from the biosphere. As an intermediate step in the process this program included removal of the long-lived radio-nuclides from liquid radioactive wastes. Fractionization, concentration, purification, and bulk storage of these isotopes was done in B Plant.

The WESF converted the strontium and cesium form from B Plant, to suitable stable solid forms (strontium fluoride and cesium chloride). The solidified material was then encapsulated and stored.

The B Plant was designed to chemically process spent nuclear fuels. Radiological containment and confinement features were incorporated in the various facilities and support systems to prevent exposure of plant personnel and the general public to excessive radiation. After plant production was terminated, the plant was modified to provide for separation and purification of selected fission products.

The Hanford Site Tank Waste Disposal Strategy (WHC 1993) has recommended that B Plant be excluded from full scale pretreatment, but continue support of WESF capsule storage and the transuranium extraction (TRUEX) pilot plant mission until these function can be transferred to a replacement strategy.

The mission of B Plant/WESF is currently safe storage and management of the cesium and strontium capsules stored in WESF. These capsules, produced and stored at WESF are used for research and medical technology.

A.2.2.3.4.9 Plutonium Finishing Plant.

A.2.2.3.4.9.1 Facility Building Titles. The PFP is composed of the following buildings:

- 234-5-Z Plutonium Conversion Facility
- 234-5-ZA Change Room Addition
- 236-Z Plutonium Reclamation Facility
- 232-Z Incinerator (lay away status)
- 242-Z Waste Treatment Facility (lay away status)
- 234-ZB Storage (for construction forces)
- 234-ZC Drum Loading Dock
- 241-Z Liquid Waste Collection Tank Vault
- 241-ZRB Waste Water Retention Basin (not in use)
- 241-ZA Sampling Building for 241-Z tanks
- 241-ZB Curbed Pad for Caustic Supply Tank
- 241-Z-361 Underground Liquid Waste Settling Tank (not in use)
- 252-Z-1 Electrical Transformer Building
- 252-Z-2 Electrical Transformer Building
- 267-Z Valve House for water supply to a 234-5-Z Sprinkler System
- 270-Z PFP Support Facility (office building)
- 291-Z Ventilation Exhaust Fan Building
- 291-Z-1 Ventilation Exhaust Stack for 234-5-Z, 236-Z and 242-Z Buildings
- 296-Z-3 Ventilation Exhaust Stack for 241-Z Vault and Tanks
- 296-Z-5 Ventilation Exhaust Stack for 2736-ZB Building
- 296-Z-6 Ventilation Exhaust Stack for 2736-ZA Building
- 296-Z-13 Ventilation Exhaust Stack for 232-Z Building
- 2503-Z Electrical Distribution System for PFP (switch yard)
- 2701-Z Old Badge House (in lay away status)
- 2701-ZA Central Station Alarm Facility
- 2701-ZD Security Badge House
- 2702-Z Microwave Tower
- 2704-Z PFP Support Facility (office building)
- 2705-Z Operations Control Facility (reception area)
- 2712-Z 291-Z-1 Stack Monitoring Station
- 2715-Z Paint and Solvent Storage
- 2715-ZL Drum Storage
- 2721-Z Emergency Electric Power Generators (diesel driven)
- 2722-Z Concrete Pad for Truck Load-Out Station
- 2727-Z Storage Building for Miscellaneous Operations and Laboratory Equipment
- 2729-Z Storage Building for Miscellaneous Maintenance Materials
- 2731-Z Storage Building for Empty Flushed Plutonium Drums
- 2731-ZA Laundry Storage Building
- 2734-Z Gas Bottle Storage Building
- 2734-ZA Liquid Argon Storage
- 2734-ZB Flammable Gas Storage
- 2734-ZC Flammable Gas Storage, P-10 Gas (10% Methane, 90% Argon), Acetylene Methane

- 2734-ZD Argon and Oxygen Bottle Supply (out of service)
- 2734-ZF Standby Gas Bottle Supply (out of service)
- 2734-ZG Standby Gas Bottle Supply (out of service)
- 2734-ZH Argon Bottle Supply (out of service)
- 2734-ZJ Liquid Nitrogen Storage Tank
- 2734-ZK Gas Bottle Storage, Acetylene, Argon, Oxygen
- 2734-ZL HF Gas Bottle Storage and Supply Piping (not in use)
- 2735-Z Chemical Storage Building (NaOH, HNO₃, and ANN)
- 2736-Z SNM Storage Vault
- 2736-ZA 2736-Z Exhaust Fan and 65KW Diesel Generator Building
- 2736-ZB SNM Shipping/Receiving Building
- 2736-ZC Loading Dock
- 2902-Z Elevated Sanitary Water Supply Tank and Valve Pit
- 2904-ZA Sampling/Monitoring Building for 216-Z-20 Crib Stream
- 2904-ZB Sampling/Monitoring Building for 216-Z-20 Crib Stream.

A.2.2.3.4.9.2 Facility Description. The PFP complex is comprised of a large number of buildings, as indicated in the previous section, many of which are relatively small structures and do not fit the definition of a nonreactor nuclear facility. The majority of the operations and activities, however, are conducted in a few "major" buildings, as described in the following paragraphs.

234-5-Z Building--The 234-5-Z Building is of steel frame construction, ≈ 500 ft (152.4 m) long by 180 ft (54.9 m) wide, with four floor levels. Internal features include reinforced concrete walls surrounding the processing area, several vault-type rooms with thick, reinforced concrete walls and ceilings, and two reinforced concrete stairwells.

The 234-5-Z Building was originally constructed to house plutonium reduction operations, plutonium machining operations, and analytical laboratory services. Current building activities include process support work in the Engineering Laboratory and the Plutonium Process Support Laboratory, plutonium conversion (currently in maintenance and upgrade outage), and plutonium product, solution, scrap and solid waste handling operations.

236-Z Building--The 236-Z Building is a reinforced concrete, above ground, canyon-type structure, 79 ft by 71 ft by 47.5 ft (24.1 m by 21.6 m by 14.5 m) high and surmounted by a 22.5-ft-high penthouse on the southwest corner. The building is adjacent to the southeast corner of the 234-5-Z Building.

The 236-Z Building houses the Plutonium Reclamation Facility (PRF) process equipment and services for Miscellaneous Treatment (MT) (scrap dissolution), slag and crucible dissolution, filtrate concentration, feed preparation, plutonium solvent extraction, product concentration, and Waste Tank processes. The PRF is capable of producing a high purity plutonium nitrate solution from a variety of feed sources by means of continuous countercurrent solvent extraction process equipment located in the canyon cell.

241-Z Building--The 241-Z Building covers a belowgrade liquid waste collection system containing five tanks in five separate covered cells. This Radioactive Liquid Waste Facility is used for intermediate storage and

neutralization of PFP aqueous wastes and is in an active status. After neutralization, the wastes are pumped to the 244-TX Tank Farm facility. A steam jet is also provided for transfer of the pump heel. Ventilation is provided for the cells and the tanks; the building is ventilated through the cells.

291-Z Building and Stack 291-Z-1. The 291-Z Building houses seven electric motor-driven fans that provide ventilation exhaust for the 234-5-Z, 242-Z, and 236-Z Buildings. The exhaust air is discharged to the atmosphere through the 200-ft (61-m) -tall 296-Z-1 Exhaust Stack. These fans plus two steam-driven exhaust turbines (for backup capability) and the inlet and exhaust plenums are the primary features of 291-Z Building. The 291-Z Building ventilation supply and exhaust system is used only to remove the heat generated by the motors and other 291-Z Building equipment. Evaporative coolers provide supply air cooling in summer; exhaust is provided by gravity damper exhaust outlets.

2736-Z Building Complex--The 2736-Z Support Storage Complex consists of the 2736-Z, 2736-ZA, 2736-ZB, and 2721-Z Buildings.

The 2736-Z Building is designated the primary Plutonium Storage Building Facility (PSF). The 2736-ZA Building provides exhaust ventilation for 2736-Z; the 2736-ZB Building is used for shipping, receiving, repackaging, and nondestructive Assay of Special Nuclear Materials; and the 2721-Z Building provides emergency electrical power.

These four buildings house all functional operations required to make the 2736-Z Support Complex self-sufficient. All four buildings have been designed or modified to meet current seismic and extreme wind resistance design criteria.

No long-term operation or production mission is currently planned for the PFP. The near-term objective of the PFP Restart Program is to process the plutonium nitrate solutions and unstable solids currently in storage to a stable form and to clean out the facility (equipment, glovebox, and cell floor) so that it can be placed in safe standby status.

The PFP went into an outage in December 1989, for routine maintenance following completion of a plutonium conversion campaign. The maintenance outage was subsequently extended to incorporate a general review and enhancement of safety systems and practices. At the time of the outage, the mission of the facility was to receive the plutonium nitrate product solution from the PUREX Plant and convert the plutonium to metal buttons. Subsequent to the outage of the PFP, the DOE directed that the PUREX and PFP be placed in standby mode pending the outcome of an EIS on the alternatives for disposition of the Hanford irradiated fuel.

At the time of the outage, most of the feed and storage tanks in the Plutonium Reclamation Facility (PRF) were full of plutonium solution of various concentrations and purity. It is essential that the plutonium in these solutions be converted to a stable form, that the facility equipment, gloveboxes, and canyon floor be flushed, and the plutonium in the flush solutions be processed to a stable form in order to ensure a safe standby status for the facility.

A.2.2.3.4.10 Plutonium-Uranium Extraction Facility.

A.2.2.3.4.10.1 Facility Building Titles. The PUREX Plant is composed of the following buildings:

- 276-A R-Cell Vault
- 281-A Backup Generator Building
- 2904-AA Instrument Facility
- 291-A-1 Canyon Exhaust Filter, Exhaust Plenum and Stack
- 291-A Steam Turbine Building
- 291-AB Air Sampler House
- 291-AC Air Sampler House
- 291-AD Exhaust Filter Building
- 291-AE Exhaust Air Filter Building
- 291-AG Sample Station
- 291-AH Ammonium Off Gas Sample Shack/Station
- 291-AK Tunnel Spray Enclosure and Caisson
- 292-AA PR Stack Sample Shack
- 292-AB Stack House - main stack
- 293-A Off Gas Treatment
- 294-A Exhaust Air Filter Instrumentation Fac
- 295-A ASD Sample Station
- 295-AA SCD Monitor/Sampler
- 295-AB PDD Sampler/Monitor
- 295-AC CSL Sampler/Monitor
- 295-AD CWL Monitor/Sampler
- 295-AE #4 Filter Building
- 202-A PUREX Canyon
- 203-A Acid Pump House
- 204-A U-Cell Vault
- 205-A Silica Gel Treatment
- 206-A Acid Fractionator
- 211-A Chemical Makeup Facility
- 212-A Waste Loadout/Loadin
- 213-A Waste Loadin
- 214-A Hazardous Waste Accumulation Area
- 218-E-14 Railroad Tunnel (Tunnel 1)
- 218-E-15 Tunnel 2
- 2701-AC Guard House
- 2708-AR Laundry Building
- 2709-A RR Cut Change House
- 271-AB Maintenance Office Annex
- 2711-A N-Cell Dry Air
- 2712-A Air Sampler Vacuum System
- 2714-A Storage (Chemical)
- 2716-A RPT Checkout Station - near RR Tunnel
- 272-A Maintenance Storage.

A.2.2.3.4.10.2 Facility Description. The 202-A Building, consists of three main structural components: (1) a thick-walled, heavily shielded concrete portion called the canyon which contains remote process cells and equipment; (2) a section comprised of three gallery levels parallel to and isolated from the canyon; and (3) a steel transite annex to the north of the

gallery section which houses offices. In addition to these structures, the laboratory, and a number of building service areas are encompassed in the PUREX Facility.

The structures in the 202-A Building are built to safely handle materials of varying degrees of radioactivity. The canyon structure with belowgrade, isolated chemical processing cells was selected as being most appropriate for a bulk radiochemical separations operation. Structures built before 1968, which include the 202-A Canyon and most of the other structures handling highly radioactive materials, were designed for typical static vertical live and dead loads in accordance with uniform building codes, Hanford Site facility standards, and other applicable design documents in effect at the time of construction. Structures built after 1968, with the exception of the third PUREX filter, were designed for the most severe possible combination of dead, live, and operating loads appropriate for the given criteria. Seismic provision is made in the load calculations for a maximum credible earthquake producing a 0.25 g horizontal ground acceleration and a 0.17 g vertical acceleration.

The PUREX Facility consists of several regulated areas. Regulated areas are those areas which are involved in the treatment, storage, and accumulation of radioactive regulated wastes. Regulated wastes are those wastes defined by state and federal regulations and include both radioactive and nonradioactive chemical wastes (including lead and silver).

The PUREX Facility was placed in a standby condition, its mission was to reprocess irradiated fuels for the recovery of uranium and plutonium. The program to design and construct the PUREX Plant (202-A Building) and the associated support facilities was initiated in 1952 by the U.S. Atomic Energy Commission (now DOE). The PUREX Plant is one of the mainstays in the U.S. nuclear fuel separations program, processing irradiated production reactor fuels for the recovery of uranium and weapons- or fuels-grade plutonium. From the first operation in 1956 to shutdown in September 1972 and from its restart in 1983 to being standby in 1990, refinements were made in the Plant to upgrade safety and process equipment, achieve process versatility, and adapt to changing feed material.

Hanford Site PUREX Facility was designed and constructed to provide supplemental fuel reprocessing capability to separate plutonium and uranium products from irradiated fuel. The facility is operated by WHC under the direction of the DOE. The PUREX process, developed at Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee, was used as an improvement over the reduction oxidation (REDOX) process.

The PUREX Facility and process was originally designed to reprocess aluminum-clad uranium metal fuel to recover weapons-grade plutonium and natural enriched uranium, but later modified to reprocess zirconium-alloy (Zircaloy) clad fuel from N Reactor to recover plutonium and uranium. This process assisted programs, such as research, reactor development, safety, and the U.S. defense; plus, provide uranium for fuel in reactors generating electricity and plutonium.

Because its first process using spent fuel in 1956, a variety of fuels have been reprocessed. The fuel enrichments have varied from 0.72% to 2.1% ²³⁵U; fuel exposures have varied from 300 to 3,000 MWd/t U; and cooling times have varied from 120 days to 7 years. Aluminum-clad and zirconium-clad fuels have been processed at the PUREX Facility. Types of fuels processed include uranium metal, uranium and plutonium oxides (Pu and Al alloys), and thorium targets. During operations, improvements were made to increase production rates, provide diverse capability to handle various fuels, provide higher quality products, decrease environmental releases, and improve the safety of the operation. Additional changes were made while the plant was on standby between September 1972 and November 1983. More are being developed and implemented during the facility's present standby condition.

The PUREX Facility was placed in a maintenance outage during the third quarter of 1990. During the fourth quarter of 1990, DOE directed that the facility transition to a standby mode pending the outcome of an EIS on the alternatives for disposition of the Hanford Site irradiated fuel. Processing of the irradiated fuels at the PUREX Facility is one of the alternatives under review. Before the facility was directed to maintain a standby mode, its mission was to reprocess irradiated fuels for the recovery of uranium and plutonium. The final EIS and Record of Decision (ROD) are not expected for ≈ 3 to 5 years.

Presently, processing activities at the PUREX Facility have been curtailed. However, periodic special operations of specialized equipment during the standby period is vital to maintain the Plant.

The objective of the PUREX Facility, until the final EIS and ROD for restart is reached, is to ensure continued preservation of the facility, equipment, administrative systems, and maintain the PUREX Plant (202-A Building) in a safe and environmentally sound condition during standby. The PUREX/UO₃ Standby Program Management Plan, contains overall direction for the transition to and maintenance of a safe and environmentally sound standby condition.

A.2.2.3.4.11 UO₃ Facility.

A.2.2.3.4.11.1 Facility Building Title. The UO₃ Plant is composed of the following buildings:

- 203-U Miscellaneous storage
- 203-UX Concentrated UNH storage
- 211-U 50% recovered nitric acid storage
- 216-U-14 Ditch
- 216-U-017 Process condensate crib
- 224-U Wet processing area
- 224-UA Calciner building
- 2714-U Storage
- 2715-U Oil storage building
- 2715-UA Insulation shop
- 2716-U Valve station
- 272-U Maintenance shop
- 272-UA Contaminated equipment storage
- MO-107 Operations offices

- MO-321 Change trailer at 211-U
- MO-351 Process engineering offices
- MO-419 Planning/scheduling offices
- MO-722 Operations/engineering offices.

A.2.2.3.4.11.2 Facility Description. The UO_3 Complex is located in 200 West Area and receives 60 wt % uranyl nitrate hexahydrate (UNH) from PUREX to further process the uranium recovered from irradiated fuel elements. The 60 wt % UNH solution produced at PUREX is transferred to the UO_3 Plant via tank trailer, pumped to Tank C-1 for accountability, then stored in Tanks X-1 and X-2. From storage, the 60 wt % UNH is pumped through vertical tube (thermo-siphon) concentrators, where the concentration of UNH is increased to essentially 100 wt %. After transfer to Tank X-30, the UNH is pumped through a loop header system to the calciners. During calcination, the UNH is almost instantaneously denitrated to UO_3 powder. The UO_3 powder is pneumatically conveyed through a powder handling system and loaded into T-hoppers for shipment from the facility. Each T-hopper has the capacity for about 6 tons of UO_3 powder. The UO_3 is then stored onsite until final disposition is determined.

A byproduct of the UO_3 production process is nitric acid. During calcination, off-gases (including oxides of nitrogen) are liberated. After scrubbing for removal of UO_3 powder, and subsequent cooling, these gases are passed through an absorber tower for conversion to nitric acid. This recovered acid is returned to PUREX for storage/reuse.

The UO_3 Plant is scheduled to conduct a final stabilization/cleanout campaign in late calendar year 1992 or early 1993. At the completion of that campaign, the facility will be prepared for transfer to the D&D program as funding becomes available.

A.2.2.3.4.12 222-S Laboratory.

A.2.2.3.4.12.1 Facility Building Titles. The 222-S Laboratory consists of the following buildings:

- 207-SL Retention Basin
- 212-S Gas Cylinder Storage
- 213-S Gas Cylinder Storage
- 219-S Waste Treatment Building
- 220-S Dry Waste Storage Building
- 222-S Control Laboratory
- 222-SA Analytical Chemical Standards Laboratory
- 222-SB Filter Building
- 222-SC Filter Building--North
- 222-SD Solid Waste Handling and Storage Facility
- 222-SF Equipment Storage
- 222-SG Gas Staging Area
- 2704-S Office Building
- 2716-S Laboratory Storage
- MO-028 Mobile Offices
- MO-037 Mobile Offices
- MO-039 Mobile Offices
- MO-346 Mobile Offices

- MO-936 Mobile Offices
- MO-947 Mobile Offices.

A.2.2.3.4.12.2 Facility Description. The 222-S Laboratory Complex was constructed in 1950 to 1951 to provide analytical and plant support for the S-Plant REDOX Complex. Through the years, the missions of the 222-S Laboratory have changed, and modifications have been made in response to new requirements and to increasingly restrictive operating and design criteria.

The design of the 222-S Main Building provides for all laboratory work to be done within the building. The building is provided with several support function shops for maintenance, instrument repair and service, electricians, millwrights, pipefitters, and glass work. Facilities for laboratory material storage, liquid, and solid waste accumulation, and storage, and filtration and exhaust are provided in areas adjacent to the 222-S Laboratory Building.

The current mission of the 222-S Laboratory Complex is as follows: Activities at the 222-S Laboratory will continue to expand as the result of relatively new programs arising from hazardous waste activities. New efforts are expected to include sample analyses as defined in the EPA SW-846 Manual and/or in the CERCLA Contract Laboratory Program. The 222-S Laboratory is also likely to support development of procedures for the HWVP and continue to increase its environmental monitoring activities.

Also, the 222-S Laboratory Complex will provide quality analytical chemistry services in support of Hanford processing plants with emphasis on waste management, chemical processing, and environmental monitoring programs at B Plant, UO₃ Plant, Tank Farms, 242-A and 242-S Evaporators, WESF, PUREX, PFP, process development/upset activities, and essential materials.

A.2.2.3.4.13 Protective Equipment Decontamination Facility (Laundry).

A.2.2.3.4.13.1 Facility Building Title. The Laundry Facility is composed of the following buildings:

- 2724-W Monitoring, Washing, and Storage
- 2724-WA Folding
- 2724-WB Loading
- 2719-WA Mask Station
- MO-406 Office.

A.2.2.3.4.13.2 Facility Description. The Protective Equipment Decontamination Facility, located in the 200 West Area, was constructed in the early 1950's and has undergone numerous upgrades and structural additions, developing into the current facility arrangement.

This facility receives laundry segregated into two categories on the basis of its use in radioactive or nonradioactive areas. Clothing worn in an area with radioactive contaminants is designated as "regulated" laundry and is assumed to be contaminated. Clothing worn in areas where radioactive contamination is not present is called "nonregulated" laundry. This clothing is stored and cleaned in separate operations to prevent contamination from the regulated clothing.

The Protective Equipment Decontamination Facility uses conventional commercial sized laundry equipment (i.e., washers, dryers, etc.).

The Protective Equipment Decontamination Facility will be shut down by the end of the calendar year 1993. The services provided by this facility have been turned over to an offsite vendor, Interstate Nuclear Service.

A.2.2.3.5 Facility System and Mission Descriptions (New Westinghouse Hanford Company-Managed 200 Area Facilities). The following descriptions of new WHC-managed nuclear facilities and their missions are contained in a Letter J. M. Knoll to R. D. Larson, "DOE Orders 5480.21, 5480.22, and 5480.23," (Knoll 1992).

A.2.2.3.5.1 Hanford Waste Vitrification Project (Project B-595). The HWVP is designing and constructing a facility that will treat Hanford Site high-level and TRU radioactive waste by vitrification, store the canistered glass onsite for an interim period, and ultimately ship the canisters for disposal in a federal geologic repository.

The clearing of the HWVP site began in April 1992. Start of construction of the facility is scheduled for the February-March 1993 timeframe. The safety documentation supporting construction activities is in place in the form of the *Hanford Waste Vitrification Project Preliminary Safety Analysis Report*, WHC-SD-HWV-PSAR-001, (WHC 1992b). The HWVP PSAR, has been approved by WHC and RL. It is currently undergoing review for approval by the U.S. Department of Energy-Headquarters (DOE-HQ).

The primary technical baseline documents used as part of the project validation package are the *Hanford Waste Vitrification Project Functional Design Criteria*, WHC-SD-HWV-FDC-001, (WHC 1992c) and the *Hanford Waste Vitrification Technical Data Package*, WHC-SD-HWV-DP-001 (WHC 1992d).

A.2.2.3.5.2 242-A Evaporator/PUREX Plant Condensate Treatment Facility (Project C-018H). This project will provide collection, treatment, and disposal systems for the combined PUREX Plant Distillate Discharge/Ammonia Scrubber Distillate stream and the 242-A Evaporator Process Condensate.

The facility will be located just outside of the northeast corner of the 200 East Area. The treatment train will consist of a seven step process which includes particulate filtration, ultra-violet (UV)/oxidation, reverse osmosis, ion exchange polishing, treatment verification, and secondary waste handling.

The disposal system will be located 7 miles west of the facility just north of the 200 West Area. A state approved land disposal system will be constructed to release the effluent to the soil.

The treatment and disposal systems provided by this project are anticipated to meet all applicable regulations, including the requirements of the U.S. EPA, Ecology, and the DOE.

Included in this effort are all necessary utilities to support the operation of this facility.

A.2.2.3.5.3 Enhanced Radioactive and Mixed Waste Storage Facility, Phase V (Project W-112). The Enhanced Radioactive and Mixed Waste Storage Facility (Project W-112) consists of three major elements:

- Radioactive and mixed waste container storage/handling
- Centralized administrative/maintenance facility
- Upgrades to central waste complex infrastructure.

This project will provide a 168,000 ft² (15,607 m²) RCRA Compliant Radioactive Mixed Waste Storage and Material Handling Facility (Phase V) for 27,000 drum equivalents (DEs) consisting of:

- Box storage building for 5,700 DEs
- Ignitable material storage for 1,000 DEs
- Automated Storage and Material Management for 7,000 DEs
 - Automated Stacker Retriever System
- Long term drum storage for 13,300 DEs
- Shipping/receiving building
- Waste container head gas sampling
- Administration area
- Transfer corridor.

Project W-112 will provide a 83,000 ft² (7,710 m²) CWC administrative support and general maintenance facility that consists of:

- Administrative area for ≈300 management and engineering staff
- Maintenance shop for support to solid waste storage, retrieval, and treatment facilities
- Change room for 65 operations, health physics, or maintenance workers
- Initial compliment of shop/administrative equipment and office furniture.

Project W-112 will provide upgrades to the Hanford Central Waste Complex infrastructure:

- Utilities
 - Sanitary water line [4.75 mi (7.6 km)]
 - 8,000 KVA electrical service [2.5 mi (4.0 km)]
 - RAW water line loop for fire protection [5 mi (8.0 km)]
- Telecommunications [2.5 mi (4.0 km)]

- Rail line extension to reach HCWC - 2 mi (3.2 km)
- Roads - 3 mi (4.8 km)
- Purpose.

The purpose of the Project W-112, is the following:

- Support waste container storage requirements
- Support WRAP process requirements
- Support efficient Hanford Central Waste Complex (HCWC) operations through:
 - Upgrades and expansion of HCWC infrastructure
 - A Central Administrative/Maintenance Facility.

A.2.2.3.5.4 Solid Waste Retrieval Facility Phase 1 (Project W-113).
 Project W-113, *Solid Waste Retrieval Facility Phase 1*, will provide for the required retrieval of suspect TRU waste from one underground location (trench) for processing at the WRAP Facilities.

The objectives of this subproject are as follows:

- Comply with the Hanford Defense Waste EIS ROD (DOE 1988)
- Provide feedstream for the WRAP facilities
- Permit final closure of burial grounds in accordance with Part B Permit.

A.2.2.3.5.5 Waste Receiving and Processing Module 1 (Project W-026).
 The WRAP, Module 1, (Project W-026), will provide certification and characterization capabilities for CH newly generated and retrieved solid TRU and suspect TRU wastes to meet requirements of RCRA, WAC 173-303 (Ecology 1989), and DOE Order 5820.2A, *Radioactive Waste Management*. This project will be the first module of WRAP, providing waste assay, examination, opening and sorting, sampling, very limited treatment, repackaging, and waste certification capabilities for retrieved and newly generated CH waste in 55-gal drums. It also will provide waste assay, examination, and certification capabilities for newly generated CH waste in standard waste boxes.

The WRAP 1 FY 94 revalidation package was based upon the United Engineers and Constructors (UE&C) prepared preliminary design report (PDR) issued in March 1992 (UE&C 1992a).

A.2.2.3.5.6 Waste Receiving and Processing Module 2A (Project W-100).
 The mission of WRAP Module 2A is to provide the processing necessary to prepare and certify Hanford Site retrievably stored and newly generated solid low-level mixed wastes for final disposal. Module 2A will provide a 60,000 ft² (5,574 m²) new facility for nonthermal treatment of solid CH to

process $\approx 640,000\text{ft}^3$ ($59,456\text{ m}^3$) of LLMW, thus eliminating potential for environmental contamination and RCRA noncompliance.

The WRAP Module 2A project will enable permanent disposal of the wastes to meet the requirements of the RCRA and WAC 173-303, *Dangerous Waste Regulations*. This project will be the second module of the WRAP, providing waste assay, examination, opening and sorting, sampling, treatment and repackaging for permanent disposal. The WRAP Module 2A will provide necessary treatment for LLMW that does not require thermal treatment. This facility will allow waste packages to be opened and size-reduced to accommodate the required processing. The waste items will be sampled for radioactive and chemical components both entering and exiting the process. Immobilization in a solid matrix using a polymer system and cement grout are the primary treatment methods. Treated wastes and wastes requiring thermal treatment will be repackaged into new containers and transferred to storage while awaiting certification for disposal or shipment to a thermal treatment facility.

The WRAP Module 2A FY-1994 budget validation package was based on the UE&C prepared Conceptual Design Report (CDR) issued in July 1992 (UE&C 1992b), an approved Functional Design Criteria (FDC) (WHC 1992e) and an approved Preliminary Safety Evaluation (PSE) (WHC 1992f).

A.2.2.4 300 Area

A.2.2.4.1 Location. The 300 Area is located immediately north of the city of Richland, Washington. The 300 Area constitutes a land mass of $\approx 0.58\text{m}^2$ (1.5 km^2) adjacent to the Columbia River (Figures A.2-1 and A.2-26). In earlier times, the 300 Area was largely dedicated to the fabrication of N Reactor Fuel. While some nuclear fuel fabrication activities are still being carried on in the 300 Area, it is also the present location of numerous nuclear-related research and development programs. These programs are contained in laboratories located within 300 Area boundaries. The laboratories in question have been constructed there over the last 30 yrs.

A.2.2.4.2 300 Area Nuclear Facilities. The following WHC-managed nuclear facilities are located within the 300 Area: 340 Waste Handling Facility, N Reactor Fuel Supply Facility, 308 Building, 309 Building, 377 Building, Surplus Facilities, and Environmental Restoration Program-Related facilities and structures.

A.2.2.4.3 Description. Drilling operations have revealed three basic geologic formations in the 300 Area. These formations are, in ascending order, as follows: the Columbia River Basalts, the Ringold Formation, and the Hanford formation (Cushing 1992).

Columbia River Basalts were formed during the Miocene Epoch. They comprise the bedrock beneath the 300 Area. Within the 300 Area, the top basalts are generally comprised of the Martindale Flow of the Ice Harbor Member of the Saddle Mountains Basalt. Top basalts are found at a depth of approximately 200 ft (60 m) below ground level.

Top basalts are overlain by the Ringold Formation, a series of sandy silt and clay layers. The portion of the Ringold Formation within the 300 Area also contains one or more permeable conglomerate or sand units. The Ringold Formation, as manifested in the 300 Area, is approximately 121 ft (37 m) in thickness.

Overlying the Ringold Formation are coarse clastic glaciofluvial sediments laid down by the ancestral Columbia River during periods when it was swollen by glacial melt water. These sediments are collectively known as the Hanford Formation. Information from test wells in the 300 Area indicates that Hanford Formation sediments make contact with the Ringold Formation deposits at depths ranging from 46 ft to 60 ft (14 m to 18 m) below the surface.

Eolian (wind-transported silt and fine-to-medium-grained sand) material overlays sediments of the Hanford Formation in the 300 Area. Eolian deposits vary from 1 ft to 13 ft (0.3 m to 4 m) in thickness in the 300 Area. The points at which there is geologic contact between eolian deposits and the glaciofluvial sediments of the Hanford Formation are quite distinct in the 300 Area.

The unconfined aquifer is found in glaciofluvial sediments of the Hanford Formation where the 300 Area is located. It is noteworthy that within the boundaries of the 300 Area, the lower portion of the unconfined aquifer is found in the Ringold Formation. The unconfined aquifer is encountered at a depth of approximately 40 ft (12 m) below the surface of the 300 Area. It continues until reaching the top portion of the Ringold Formation at depths ranging from 46 ft to 66 ft (14 m to 20 m). The exact direction of groundwater flow in the 300 Area is determined, at any given time, by natural and human influences. The primary natural source of influence on groundwater flow in the 300 Area is the Columbia River (Cushing 1992).

Even though the top of the unconfined aquifer is relatively close to the surface in the 300 Area, earthquake induced soil liquefaction and differential sediment compaction are not of concern. This is because of obliging soil and subsurface material types and the relatively flat topography of the 300 Area (ERDA 1975).

Data pertaining to 300 Area meteorological parameters are gathered at the 300 Area Meteorological Tower, located within the boundaries of the 300 Area itself. Among the data collected at the 300 Area Meteorological Tower are those pertaining to relative frequencies of wind speed, wind direction, and atmospheric stability. These data are used to calculate atmospheric dispersion (χ/Q) values for the 300 Area. Chronic χ/Q values reflect atmospheric dispersion under routine (non-accident) conditions. Worst-case χ/Q values assume a postulated short-term accidental airborne release, with worst-case atmospheric conditions that would be exceeded only 5% of the time in a given year. Ground level chronic and 95% worst case acute ground level χ/Q values are shown in Tables 2-9 and 2-10, respectively. There are no facilities in the 300 Area which meet criteria that justify stack-level χ/Q calculations.

Four archeological sites are partially located within the 300 Area. None of these sites is presently listed on the National Register of Historic Places. However, none of the sites in question has been subjected to a formal evaluation process. Manhattan Project Buildings are located within the boundaries of the 300 Area as well. These buildings also have not been evaluated as to their National Register potential. In general, the 300 Area does not seem to possess great historical or archeological value. This is due, at least in part, to the fact that it has been greatly disturbed by industrial activities over the last 50 years (Cushing 1992).

A.2.2.4.4 Facility System and Mission Descriptions (Existing WHC-Managed Facilities in The 300 Area). The following descriptions of existing WHC-managed facilities and their missions are contained in a Letter J. M. Knoll to R. D. Larson, "DOE Orders 5480.21, 5480.22, and 5480.23," (Knoll 1992).

A.2.2.4.4.1 340 Waste Handling Facility. The 340 Waste Handling Facility includes the following buildings:

- 340 Liquid Waste Storage
- 340-A Auxiliary Liquid Waste Storage
- 340-B Liquid Waste Loadout/Solid Waste Storage
- MO-036 Office Trailer.

A.2.2.4.4.1.1 Facility Description. The 340 Facility serves as a radioactive/mixed liquid waste handling facility servicing Pacific Northwest Laboratories (PNL) located in the 300 Area. Waste is received at the facility from these laboratories via the Radioactive Liquid Waste System (RLWS), an underground pipeline. The facility accumulates, stores, and ships this waste via rail tankers to the DSTs. The current mission of the 340 Waste Handling Facility is to continue to support the PNL, located in the 300 Area.

The facility also provides radioactive monitoring for nonhazardous, potentially radioactive process sewer waste, from the Retention Process Sewer (RPS). The facility maintains diverter stations in several 300 Area laboratories. These diverter stations monitor for radioactivity and if detected, divert waste to the RLWS. If radioactivity is not detected, the waste continues toward the 307 Basins located at the 340 Facility. Before entering the basins, the waste is monitored a second time. If not radioactively contaminated, the waste is automatically transferred to the 300 Area Process Sewer.

A.2.2.4.4.2 N Reactor Fuel Supply Facility. The recently issued DOE Order 5480.23 requires that up-to-date safety documentation be provided for each DOE nuclear facility and subsequent significant modifications, including decommissioning. This DOE order also requires that a upgrade plan be developed by each contractor to bring their facilities into compliance. Further, each Nuclear facility must identify the interim controls and restrictions to be applied until the SAR and OSR/TS can be upgraded to the new requirements. The WHC has developed a procedure to standardize the identification of the interim controls and restrictions in a new document. This new document is identified in WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*, Chapter 8.0, "Interim Safety Basis. The intent of the ISB is to document the SAFETY BASIS for each Nuclear facility and the controls

necessary to assure that a facility can continue to function safely until the SAR and OSR/TS can be upgraded. An ISB will provide the information necessary to conclude that hazards are controlled and that the planned activities can be conducted safely.

This ISB/USQ plan provides the N Reactor Fuel Supply (NRFS) Facility input to the overall WHC ISB/USQ implementation plan that will be provided to DOE.

A.2.2.4.4.2.1 Facility Building Titles. The NRFS Facility consists of a complex of 17 buildings located in the northeast corner of the Hanford 300 Area. The individual buildings are listed below with their function and status, as follows:

• 303-A	Uranium Fuel Storage,	Active
• 303-B	Uranium Fuel Storage,	Active
• 303-E	Uranium Fuel Storage,	Active
• 303-F	Pumphouse,	Active
• 303-G	Uranium Fuel Storage,	Active
• 303-K	Mixed and Radioactive Solid Waste Storage,	Active
• 303-M	Uranium Oxide Facility,	Inactive
• 304	Waste Concretion,	Active
• 311	Tank Farm,	Active
• 313	Manufacturing Support and Uranium Fuel Storage,	Active
• 333	Fuel Manufacturing,	Active
• 334-A	Waste Acid Storage,	Inactive
• 334	Process Sewer Monitoring,	Active
• 3707-G	Change House,	Active
• 3712	Uranium Fuel Storage,	Active
• 3716	Unfinished Uranium Fuel Storage,	Active
• M0-052	Office Trailer,	Active.

A.2.2.4.4.2.2 Facility Description. The NRFS Facility includes two major structures, the 313 and 333 Buildings. The primary fuel fabrication operations were conducted in 333 Building. The remaining structures were used as support buildings to the fabrication operations.

The history of the NRFS Facility began in 1943 when the 313 Building was constructed to house manufacturing equipment for the Hanford Site single pass reactors fuel. Fuel production began in mid-1944, and continued through the early 1950's. The facility was then expanded to allow for increased fuel production. In the late 1960's, a process, which included nickel plating of the bare uranium cores before cladding, was developed and installed. This process continued until 1971, when the production line was shut down along with the single pass reactors. Other programs conducted at the 313 Building include support of a tritium production program from 1948 to 1952 and a thorium program in the late 1960's. For N Reactor Fuel Fabrication, the 76,199-ft² (7,078.8-m²) 313 Building provided waste treatment system, administrative offices, training, and warehouse space. This building also houses a complete N Reactor pressure tube fabrication facility consisting of a 4,000 ton Sutton extrusion press, draw bench, grinders, autoclaves, inspection, equipment and chemical cleaning equipment. This Hanford Site Metal Working Process is being considered for a privatization initiative.

The 333 Building, constructed in 1958, houses the primary fabrication equipment for manufacturing N Reactor fuel. Fuel fabrication operations began in 1962. From 1965 to 1967, the facility also was used to construct lithium aluminate targets for demonstration of co-production in the N Reactor. The 46,633 ft² (4,332,2 m²) building contained equipment for all operations from initial component cleaning to finished fuel assembly, inspection, and packaging for shipment. Fabrication activities continued until N Reactor entered the standby phase in 1987.

The NRFS Facility is no longer used for fuel production and is undergoing transition activities required for permanent closure outlined in WHC-SP-0793, *N Reactor Fuel Fabrication Facilities Shutdown Program Plan*, (WHC 1992g). After N Reactor was placed in standby condition in 1987, the NRFS Facility also began transition to standby status.

The transition from standby to the shutdown phase began in March, 1992. Three major areas of work; consolidation of the special nuclear material (SNM), completion of work defined in RCRA closure plans, and shutdown and cleanup of remaining facilities for turnover to the D&D organization are planned to be completed by October 1, 1996, provided necessary funding is achieved. In FY 1997, the non-SNM containing buildings are planned to be transferred to the D&D organization, while the six SNM containing buildings will require continued control as a nuclear facility until the SNM can be removed. Upon removal of SNM and compliance with acceptance criteria, these buildings also can be transferred to the D&D organization.

A significant unirradiated uranium inventory, present at the time N Reactor standby was announced, is stored in the facility. The total amount of SNM currently stored is 2,227 metric tons located in seven buildings. A major portion of the uranium inventory consists of 0.95% to a maximum of 1.25% U²³⁵ enrichments now packaged in wooden boxes. The majority of the uranium is in the form of extrusion billets. A transfer to the United Kingdom of 326 metric tons of billets is presently underway. Part of the uranium inventory is in the form of fuel elements, some of which were partially fabricated at the time fabrication ceased. A portion of the fuel being stored had been loaded into N Reactor, but was never irradiated. The SNM will require storage at the NRFS Facility until an alternate storage facility or specific use/user has been identified. The storage buildings will require continuing surveillance, including building and system maintenance, safeguards and security, and regulatory compliance until the SNM has been moved to an alternate storage facility.

Several RCRA closure plans have been prepared for a few of the non-SNM storage buildings. The RCRA closures for these buildings are anticipated to be completed by April 1, 1996, before turnover to the D&D organization. Besides the RCRA closure, the non-SNM storage buildings will require removal of radioactive and hazardous wastes, cleanup and/or stabilization of radioactive/contaminated areas or zones, removal of excess materials, and disposition of assets before acceptance into the D&D program scheduled for October 1, 1996.

A minimum operating staff currently provides surveillance and basic maintenance for the facility. In addition, operations staff has been involved with the disposal of essential materials and waste to reduce the operational

costs. Removal of bulk chemical inventories was completed in April, 1991. The cleanup of uranium residues from fabrication equipment has begun. Cleanup will reduce radiological concerns and minimize the risk of spontaneous or accidental fires involving residual pyrophoric, uranium chips and fines.

A.2.2.4.4.3 308 Building. The 308 Building is a two story structure constructed of reinforced concrete, concrete block, and steel siding. It was designed as a multipurpose nuclear facility for the development and fabrication of nuclear reactor fuel. The building, erected in 1960, has undergone several additions since the original construction to reach the current 71,000 ft² (6,595.9 m²).

The facility will no longer be used for nuclear fuel development or fabrication and is currently in transition to shutdown for turnover, remedial action and/or decommissioning. All nuclear materials used in the fuel fabrication process have been removed from the building with the exception of relatively small amounts of plutonium oxide powder held up in the gloveboxes and associated exhaust ducting.

The facility also contains a neutron radiography facility Test Reactor and Isotope Production General Atomics (TRIGA) Reactor located in an annex of the Building. This 250 KW reactor was used to prepare neutron radiographs of FFTF Reactor fuel pins fabricated by offsite vendors and in the 308 Building. The reactor was operated and maintained under an FSAR (WHC 1975) and Technical Specifications (WHC 1988) separate from the 308 Building document.

The reactor is currently shutdown and partially defueled in preparation for eventual fuel removal. The reactor was downloaded and is being monitored under a RL approved shutdown plan (WHC 1990b). Under this plan the downloaded TRIGA reactor is designated as a fuel storage basin. The plan prepared as a supplement to the TRIGA FSAR and TS identifies the applicable technical specifications to be followed for monitoring the downloaded reactor. The ultimate disposition of the fuel is uncertain at this time, but several options are being considered including 200 West Area storage.

A.2.2.4.4.4 309 Building.

A.2.2.4.4.4.1 Facility Building Titles. The 309 Building current contains the SP-100 Ground Engineering System (GES) Test Site.

A.2.2.4.4.4.2 Facility Description. The building consists of a containment dome, a service and control building, and a maintenance mockup wing. The building is occupied by ≈110 personnel.

The 309 Building originally contained the Plutonium Recycle Test Reactor (PRTR) used to develop the technology for use of plutonium in thermal heterogeneous power reactors. In 1969, the reactor was placed in layaway condition, all PRTR fuel was removed and decontamination was performed. In the mid 1980's all PRTR equipment in the containment A, B, and C cells was removed, in preparation for the SP-100 ground test mission. The Plutonium Recycle Critical Facility (PRCF) has been removed, D&D.

The primary feature of the building is the welded steel PRTR containment dome, a cylindrical structure with a hemispherical top and bottom. The PRTR vessel is centrally located in the dome, belowgrade and inside concrete shielding. The A, B and C cells surround the PRTR vessel.

A one-story steel structure and basement adjoins the containment dome, currently providing general office space, and heating and ventilation equipment.

The maintenance and mockup wing contains the a mockup of the FFTF interim examination and maintenance (IEM) cell, office space and floor space for equipment assembly and testing.

The service building dimensions are 80 x 100 ft (24.3 x 30.5 m), the maintenance and mockup wing is 61 x 100 ft (18.6 x 30.5 m) and the containment vessel is 80 ft (24.4 m) in diameter and extends 75 ft (22.9 m) abovegrade. These and the work area total 46,708 ft² (4,339 m²).

The 309 Building is designated as the ground test site for the SP-100 space based reactor.

In the interim, the 309 Building will be used for the following:

- General office space
- Equipment and hardware assembly; and
- FFTF IEM cell mockup and training activities.

Near term mission changes will include testing of boxed waste assay system in support of WRAP.

A.2.2.5 400 AREA

A.2.2.5.1 Location. The 400 Area covers $\approx .81\text{mi}^2$ (2.1 km²) of land in the southcentral portion of the Hanford Site (Figure A.2-1). The 400 Area is located $\approx 5\text{mi}$ (8 km) north of the 300 Area and $\approx 6\text{mi}$ (9.5 km) north of the Richland city limits. This Hanford Site is the location of the FFTF, as can be seen in Figure A.2-27.

A.2.2.5.2 400 Area Nuclear Facilities. Existing WHC-managed nuclear facilities in the 400 Area are as follows: FFTF and the Maintenance and Storage Facility (MASF) which is included as building within the FFTF.

A.2.2.5.3 Description. The structures in the 400 Area are anchored on the Hanford Formation, comprised of glaciofluvial, medium to coarse sand and gravelly coarse sand. The material of the Hanford Formation is quite dry, less than 2% moisture by weight. Underlying the Hanford Formation is the Ringold Formation, comprised of sandy gravel and gravelly coarse sand. The Ringold Formation in turn overlays the basalts and sedimentary interbeds of the Columbia River Basalt Group and Ellensburg Formation.

The 400 Area is relatively flat. This fact, coupled with high soil permeability and porosity and a low rate of precipitation, tends to preclude the water erosion of 400 Area Soils. Conversely, the soils and sandy gravels

of the 400 Area are quite subject to wind erosion. Thus, at times, winds observed in the 400 Area are of sufficient magnitude to transport soils through the air. However, soil erosion is markedly reduced by the vegetative ground cover within 400 Area Boundaries.

Soils of the 400 Area have good loadbearing characteristics and are not particularly prone to seismically induced liquefaction or settling, at least in part because the unconfined aquifer is located in the Hanford Formation, ≈ 165 ft (50 m) below the surface. Soil and rock characteristics of the 400 Area, in addition to characteristics of the underlying unconfined aquifer, have been subjected to thorough study (Bechtel 1970).

Data pertaining to 400 Area meteorological parameters are gathered at the 400 Area Meteorology Tower. Among those data collected at the tower are those pertaining to relative frequencies for: wind speeds, wind directions, and atmospheric stabilities. These data are used as a basis from which to calculate atmospheric dispersion (χ/Q) values. Chronic χ/Q values reflect atmospheric dispersion under postulated routine (nonaccident) conditions. Worst-case χ/Q values assume a postulated short-term accidental airborne release, with worst-case atmospheric conditions that would be exceeded only 5% of the time in a given year. Ground level chronic and 95% worst case acute χ/Q values are shown in Tables A.2-11 and A.2-12, respectively. There are no facilities in the 400 Area which meet criteria that justify stack-level χ/Q calculations.

Most of the land in the 400 Area has been so thoroughly disrupted by construction activities that archeological surveys have yielded no cultural materials of any value. Nor are there any sites of archeological or historical value within 1.2 mi (2 km) of the 400 Area (Cushing 1992).

A.2.2.5.4 Facility System and Mission Descriptions (Existing Westinghouse Hanford Company-Managed 400 Area Facilities). The following descriptions of existing WHC-managed facilities and their missions is contained in a Letter J. M. Knoll to R. D. Larson, "DOE Orders 5480.21, 5480.22, and 5480.23," (Knoll 1992).

A.2.2.5.4.1 Fast Flux Test Facility.

A.2.2.5.4.1.1 Facility Building Titles. The FFTF is composed of the following buildings:

• 403	Fuel Storage Facility
• 405	Reactor Containment Building
• 408-A, B, and C	Dump Heat Exchanger Buildings
• 437	MASF
• 480-A, B, and C	Water Supply Well Buildings
• 481	Water Pumphouse
• 481-A	Water Pumphouse
• 482-A, B, and C	Water Storage Tank Buildings
• 483	Cooling Tower Building
• 484	ICCW Equipment Building
• 491-E, S, and W	HTS Service Buildings
• 4621-E and W	Aux Equipment Buildings
• 4703	Control Building

- 4716 Maintenance Tool Storage Facility
- 4717 Reactor Service Building
- 4721 Emergency Generator Facility
- 4842-B Pumphouse Switchgear Building.

Note: All other buildings in the 400 Area Protected Area are controlled by other organizations.

A.2.2.5.4.1.2 Facility Description. The FFTF is located on the DOE Hanford Site near Richland, Washington, and is operated by the WHC. This facility was designed specifically for irradiation testing of nuclear reactor fuels and materials for liquid-metal-fast-breeder reactors. The term FFTF includes the reactor as well as the equipment and structures for heat removal, containment, core component handling and examination, instrumentation and control, and for supplying utilities and services such as emergency power generation and irradiated fuel storage.

The reactor is a sodium-cooled, fast-neutron-flux reactor. Nominal conditions at a design power level of 400 MW include a peak neutron flux of 7×10^{15} n/cm²-s (60 to 65% > 0.1 MeV), a reactor inlet pressure of 133 psig, reactor inlet and outlet temperatures of 680° F (360° C) and 980° F (526.6° C), and a sodium flow rate of 43,500 gal/min (164,664 L/min). Present nominal conditions are slightly below these design conditions as a result of the "Core Demonstration" experiment. Heat from the reactor is normally removed by three heat transport circuits.

The dump heat exchanger are sodium-to-air exchanger that transfer heat from the secondary loop to the ambient air. On loss of normal power, decay heat removal is provided via the heat transport circuits with the primary and secondary pumps being driven by "pony" motors powered from onsite emergency electrical generators. In the event that all electrical power is lost, natural circulation is sufficient for providing safety-grade decay heat removal.

The FFTF is presently in a standby condition.

A.2.3 SURPLUS FACILITIES

A.2.3.1 Program Description

Many DOE owned nuclear facilities at the Hanford Site that were used during the early nuclear energy programs do not have a current use and have been retired and declared excess. The majority of these facilities have residual radioactive contamination requiring surveillance, maintenance, and ultimate disposal. All are located in either the 100, 200, or 300 Areas.

The surplus facilities and RCRA closure program manages these facilities to meet the objectives itemized below.

- Continue maintenance and surveillance of the retired SFRC facilities in a safe, cost-effective, and environmentally sound manner pending D&D.

- Provide the planning and engineering necessary to ensure the efficient, cost-effective decommissioning of the SFRC retired facilities.
- Develop short- and long-range budgets and schedules, including identification of projects to complete decommissioning of all contaminated facilities within the program.
- Assess technical and economic feasibility of decommissioning and surveillance alternatives.
- Determine if there are any cost-effective reuses for shutdown facilities.
- Comply with the provisions of both Washington State and Federal environmental policies and develop support documentation.
- Develop innovative, cost-effective decommissioning, surveillance, and asbestos abatement methods that comply with regulatory requirements for environmental and occupational safety.
- Decommission facilities in the safest and most cost-effective manner practicable.
- Maintain worker exposure as low as reasonable achievable (ALARA) levels through the use of administrative or engineered controls.

A.2.3.2 Categories of Facilities

Surplus facilities have been grouped into five categories.

- I Major production facilities with radiological, hazardous material, and asbestos inventories with a potential for routine personnel access.
- II Support facility with radiological, hazardous material, and asbestos inventories, with a potential for routine personnel access.
- III Service type facility (supplied water, ventilation, air, storage, security, power, etc for facility operation) with possible radiological, hazardous, and asbestos inventories (low volumes) with a potential for occasional personnel access.
- IV Other miscellaneous facilities that are not normally accessed, a very low (or inaccessible) inventory or radiological or hazardous material. Special access controls may be invoked following assessment.
- V Remaining facilities not otherwise covered and not normally accessed (i.e., outfall, stacks, structures, etc.)

The table below itemizes the current facilities in each category as follows: (It should be noted that these lists are dynamic.)

1. Category I

- 105B
- 105C
- 105D
- 105-DR
- 105-F
- 105-H
- 105-KE
- 105-KW
- 221/271-U
- 202-S
- 233-S
- 224-B.

2. Category II

- 185-B
- 182-K
- 190-KW
- 233-SA
- 212-N
- 212-P
- 212-R
- 108-F
- 115-KE
- 115-KW
- 232-Z
- 165-KW
- 190-C.

3. Category III

- 291-S
- 292-S
- 2718-S
- 1701-BA
- 104-B2
- 183-C
- 103-D
- 1702-DR
- 1701-K
- 1713-KER
- 1714-KW
- 1713-H
- 167-K
- 241C801
- 241SX401
- 241SX402
- 291-U
- 293-S

- 2904-SA
- 103-B
- 119-DR
- 1702-C
- 1701-FA
- 205-A
- 241A431
- 215-C
- 166-AKE
- 276-S
- 292-U
- 2715-S
- 119-KE.

4. Category IV

- 190-B
- 276-U
- 104-B1
- 1714-C
- 1720-HA
- 241-WR
- 117-KE
- 117-KW
- 117-DR
- 1702-KE
- 1702-KW
- 110-KW
- 1608-B.

5. Category V

- All Others.

A.2.4 ENVIRONMENTAL RESTORATION PROGRAM

A.2.4.1 Program Description

It is the charter of the Environmental Restoration (ER) Program to plan, coordinate, integrate, and implement the national ER Program for the entire Hanford Site (i.e., all Hanford Site). This includes the program management associated with inactive waste site identification and characterization; technology development and demonstration; remedial investigations/feasibility studies (RI/FS); remedial design and cleanup actions; and post-closure activities of inactive radioactive, mixed, and hazardous waste sites.

The ER Program provides an identifiable, coherent program by which activities supporting the Hanford Site-specific Environmental Restoration Remedial Actions (ERRA) can be coordinated and reported. This includes program definition, integration, and the control of cost, scope and scheduling necessary to implement the requirements of the CERCLA; the SARA; and the RCRA. Selected treatment, storage, or disposal activities; Hanford surplus

facilities management; D&D; radiation area reduction; underground storage tanks (UST); asbestos abatement; and *National Environmental Policy Act of 1969* activities are within the scope of this program.

All WHC-managed waste sites encompassed by the ER Program have been grouped together during the implementation effort for DOE Orders 5480.21, 5480.22, and 5480.23.

A.2.4.2 Responsibilities

The Environmental Division has established the responsibilities for the management of Waste Management Units (WMUs) in WHC-CM-1-3, MRP 5.10, "Management of Waste Management Units".

The following list details the responsibilities for WMUs.

- Inactive WMUs shall be the responsibility of the associated facility management or landlord, except those radioactive WMUs already assigned to ENV and those transferred by a formal documented process.
- Active WMUs shall be the responsibility of the primary facility/program discharging or disposing waste to the WMU.
- Surface contamination originating from identified WMUs shall be assigned to that WMU manager.
- Surface contamination that cannot be attributed to an existing WMU shall be assigned by the Environmental Division.
- The WMUs located within operating facility boundaries or fences shall be the responsibility of the specific facility manager.
- When an operable unit becomes active, the responsibility for the WMU will be transferred to the Remediation Manager.

The organizational responsibilities identified above need to be reviewed to evaluate and assess the current compliance status with the requirements for the Environmental Division. This assessment also will identify the need for program enhancements and implementation costs. A separate funding change request will be submitted based on the results of the assessment (ECD January 1993).

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A.2.5.2 U.S. Department of Energy Orders

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- DOE, 1991, *Unreviewed Safety Questions*, DOE Order 5480.21, U.S. Department of Energy, Washington, D.C.
- DOE, 1992, *Technical Safety Requirement*, DOE ORDER 5480.22, U.S. Department of Energy, Washington, D.C.

DOE Order 5480.23, *Nuclear Safety Analysis Reports*, U.S. Department of Energy, Washington, D.C.

A.2.5.3 U.S. Department of Energy, Richland Operations Orders

DOE-RL Order 5820.2A, *Radioactive Waste Management*, U.S. Department of Energy-Richland Operations Office, Richland, Washington.

A.2.5.4 State and Federal Acts

Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901 et seq.

Safe Drinking Water Act of 1974, 42 USC 300f et seq.

Toxic Substance Control Act of 1976, 15 U.S.C. 2601 et seq.

Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 USC 9601 et seq.

Superfund Amendments and Reauthorization Act of 1986, 42 USC 11001, et seq.

National Environmental Policy Act of 1969, 42 USC 4321 et seq.

A.2.5.5 Westinghouse Hanford Company Controlled Manuals

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Figure A.2-1. Hanford Site Map and Selected Facilities.

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Figure A.2-2. Population (1990 Census) for Counties and Selected Cities Within a 50-mi (80-km) Radius of the Hanford Meteorological Station.

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GENIFB 5/93

Figure A.2-3. Residential Population Within a 50-mi (80-km)
Radius of the Hanford Meteorological Station--1990.

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GENIFB 5/93

Figure A.2-4. Residential Population Within a 50-mi (80-km)
Radius of the 100 N Area Meteorological Tower--1990.

Ring km (mi)	0-16 (0-10)	16-32 (10-20)	32-48 (20-30)	48-64 (30-40)	64-80 (40-50)	Total 0-80 (0-50)
Population	598	7,790	53,109	163,614	150,138	375,249

39111036.14
GENIFB 5/93

Figure A.2-5. Residential Population Within a 50-mi (80-km) Radius of the 300 Area Meteorological Tower--1990.

Ring km (mi)	0-16 (0-10)	16-32 (10-20)	32-48 (20-30)	48-64 (30-40)	64-80 (40-50)	Total 0-80 (0-50)
Population	30,436	98,634	26,806	62,293	63,440	281,609

39111036.7
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Figure A.2-6. Residential Population Within a 50-mi (80-km)
Radius of the 400 Area Meteorological Tower--1990.

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Figure A.2-8. Wind Roses for the Hanford Meteorological Station and 12 Supplementary Wind Measurement Stations
(Based on 3 Years of Hourly Data).

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Figure A.2-9. Greatest Depth of Snow on the Ground During the Winters of 1946-1947 to 1980-1981 and the Probability (5) that the Greatest Depth of Snow Will Exceed a Given Amount.

Figure A.2-10. Surface Water Bodies Within the Columbia Plateau.

Figure A.2-11. Flooded Area Resulting from a 50% Breach of Grand Coulee Dam (COE 1951).

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Figure A.2-12. Extent of Probable Maximum Flood in Cold Creek Area (SKaggs and Walters 1981).

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Figure A.2-13. Areal Distribution of Equivalent Hydraulic Conductivity for the Unconfined Aquifer Across the Hanford Site (Clearlock et al. 1975).

Figure A.2-14. Location of Groundwater Monitoring Wells
Sampled in 1986 (PNL 1987).

39112054.15b
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Figure A.2-15. Divisions of the Columbia Intermontane Province and Adjacent Provinces (Freeman et al. 1945; Thornbury 1965).

Figure A.2-16. Map of Potential Seismic Sources in and Around the Hanford Site.

Figure A.2-17. Hanford Site Seismic Hazard Curves.

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Figure A.2-18. The 100-B and 100-C Reactor Areas.

Figure A.2-19. The 100-D and 100-DR Reactor Areas.

Figure A.2-22. The 100-K Reactor Area.

Figure A.2-23. The 100-N Reactor Area.

Figure A.2-24. The 200 West Area.

Figure A.2-25. The 200 East Area.

Figure A.2-26. Building Locations Within the 300 Areas.

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Figure A.2-27. The 400 Area.

Figure A.2-28. Schematic 200 Areas Tank Farm Facilities.

Table A.2-1. Sector-Averaged Atmospheric Dispersion Coefficients (sec^{-3})
For Chronic Ground-Level Releases From the 100 Areas.

TRANSPORT DIRECTION	DISTANCE (km)									
	0.8	2.4	4.0	5.6	7.2	12	24	40	56	72
N	3.6E-06	5.7E-07	2.6E-07	1.6E-07	1.1E-07	5.1E-08	1.9E-08	9.6E-09	6.1E-09	4.4E-09
NNE	3.2E-06	5.1E-07	2.3E-07	1.4E-07	9.6E-08	4.6E-08	1.8E-08	8.7E-09	5.5E-09	3.9E-09
NE	4.8E-06	7.5E-07	3.4E-07	2.1E-07	1.4E-07	6.8E-08	2.6E-08	1.3E-08	8.3E-09	5.9E-09
ENE	7.3E-06	1.2E-06	5.3E-07	3.2E-07	2.2E-07	1.1E-07	4.1E-08	2.1E-08	1.3E-08	9.5E-09
E	1.0E-05	1.6E-06	7.3E-07	4.4E-07	3.1E-07	1.5E-07	5.7E-08	2.8E-08	1.8E-08	1.3E-08
ESE	6.0E-06	9.4E-07	4.3E-07	2.6E-07	1.8E-07	8.7E-08	3.4E-08	1.7E-08	1.1E-08	7.7E-09
SE	4.8E-06	7.4E-07	3.4E-07	2.1E-07	1.4E-07	7.0E-08	2.7E-08	1.4E-08	8.7E-09	6.2E-09
SSE	4.3E-06	6.8E-07	3.1E-07	1.9E-07	1.3E-07	6.4E-08	2.5E-08	1.2E-08	8.0E-09	5.8E-09
S	4.6E-06	7.3E-07	3.3E-07	2.0E-07	1.4E-07	6.8E-08	2.6E-08	1.3E-08	8.4E-09	6.0E-09
SSW	2.7E-06	4.2E-07	1.9E-07	1.2E-07	8.0E-08	3.9E-08	1.5E-08	7.5E-09	4.8E-09	3.4E-09
SW	3.2E-06	5.0E-07	2.3E-07	1.4E-07	9.7E-08	4.7E-08	1.8E-08	9.1E-09	5.8E-09	4.2E-09
WSW	3.7E-06	5.9E-07	2.7E-07	1.6E-07	1.1E-07	5.4E-08	2.1E-08	1.0E-08	6.7E-09	4.8E-09
W	7.0E-06	1.1E-06	5.1E-07	3.1E-07	2.1E-07	1.0E-07	3.9E-08	2.0E-08	1.2E-08	9.0E-09
WNW	4.6E-06	7.2E-07	3.3E-07	2.0E-07	1.4E-07	6.5E-08	2.5E-08	1.2E-08	7.8E-09	5.6E-09
NW	3.7E-06	5.8E-07	2.6E-07	1.6E-07	1.1E-07	5.3E-08	2.0E-08	9.8E-09	6.2E-09	4.4E-09
NNW	2.5E-06	3.9E-07	1.8E-07	1.1E-07	7.3E-08	3.5E-08	1.3E-08	6.5E-09	4.1E-09	3.0E-09

Table A.2-2. 95th Percentile Centerline Atmospheric Dispersion Coefficients
(cm^{-3}) For Acute Ground-Level Releases from the 100 Areas.

TRANSPORT DIRECTION	DISTANCE (km)									
	0.8	2.4	4.0	5.6	7.2	12	24	40	56	72
N	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
NNE	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
NE	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
ENE	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
E	9.8E-04	1.7E-04	8.5E-05	5.4E-05	3.9E-05	1.9E-05	8.6E-06	4.6E-06	3.1E-06	2.3E-06
ESE	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
SE	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
SSE	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
S	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
SSW	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
SW	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
WSW	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
W	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
WNW	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
NW	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
NNW	1.0E-03	1.8E-04	8.7E-05	5.5E-05	4.0E-05	2.0E-05	8.7E-06	4.7E-06	3.1E-06	2.3E-06

Table A.2-3. Sector-Averaged Atmospheric Dispersion Coefficients (sec^{-3})
For Chronic Stack-Level (89 m) Releases From the 100 Areas.

TRANSPORT DIRECTION	DISTANCE (km)									
	0.8	2.4	4.0	5.6	7.2	12	24	40	56	72
N	5.9E-08	6.0E-08	4.9E-08	3.9E-08	3.2E-08	1.9E-08	9.3E-09	5.2E-09	3.5E-09	2.6E-09
NNE	4.5E-08	4.9E-08	4.1E-08	3.3E-08	2.7E-08	1.7E-08	8.1E-09	4.6E-09	3.1E-09	2.3E-09
NE	8.5E-08	7.2E-08	6.0E-08	4.8E-08	3.9E-08	2.5E-08	1.2E-08	6.9E-09	4.7E-09	3.5E-09
ENE	1.0E-07	8.6E-08	7.4E-08	6.2E-08	5.2E-08	3.4E-08	1.8E-08	1.0E-08	7.1E-09	5.3E-09
E	1.6E-07	1.2E-07	1.1E-07	8.8E-08	7.4E-08	4.8E-08	2.5E-08	1.4E-08	9.8E-09	7.4E-09
ESE	1.3E-07	8.1E-08	6.7E-08	5.4E-08	4.5E-08	2.9E-08	1.5E-08	8.5E-09	5.8E-09	4.4E-09
SE	1.1E-07	6.6E-08	5.3E-08	4.2E-08	3.5E-08	2.3E-08	1.2E-08	6.7E-09	4.6E-09	3.5E-09
SSE	1.0E-07	5.8E-08	4.6E-08	3.7E-08	3.1E-08	2.0E-08	1.0E-08	6.1E-09	4.2E-09	3.2E-09
S	1.2E-07	7.0E-08	5.6E-08	4.4E-08	3.6E-08	2.3E-08	1.1E-08	6.6E-09	4.5E-09	3.4E-09
SSW	6.4E-08	4.0E-08	3.2E-08	2.6E-08	2.1E-08	1.4E-08	6.8E-09	3.9E-09	2.7E-09	2.0E-09
SW	5.8E-08	4.1E-08	3.4E-08	2.7E-08	2.3E-08	1.5E-08	7.5E-09	4.4E-09	3.0E-09	2.2E-09
WSW	4.7E-08	4.5E-08	3.8E-08	3.1E-08	2.6E-08	1.7E-08	8.7E-09	5.0E-09	3.5E-09	2.6E-09
W	1.0E-07	9.2E-08	7.8E-08	6.3E-08	5.3E-08	3.4E-08	1.7E-08	9.7E-09	6.6E-09	4.9E-09
WNW	7.4E-08	7.6E-08	6.2E-08	4.9E-08	4.0E-08	2.5E-08	1.2E-08	6.5E-09	4.4E-09	3.3E-09
NW	6.3E-08	6.5E-08	5.3E-08	4.1E-08	3.3E-08	2.1E-08	9.7E-09	5.4E-09	3.6E-09	2.7E-09
NNW	4.6E-08	4.4E-08	3.6E-08	2.8E-08	2.3E-08	1.4E-08	6.6E-09	3.7E-09	2.5E-09	1.8E-09

Table A.2-4. 95th Percentile Centerline Atmospheric Dispersion Coefficients (sec m^3) For Acute Stack-Level (61 m) Releases From the 100 Areas.

TRANSPORT DIRECTION	DISTANCE (km)									
	0.8	2.4	4.0	5.6	7.2	12	24	40	56	72
N	2.6E-05	2.2E-05	1.8E-05	1.4E-05	1.3E-05	9.3E-06	5.4E-06	3.3E-06	2.3E-06	1.8E-06
NNE	2.4E-05	2.2E-05	1.8E-05	1.4E-05	1.3E-05	9.2E-06	5.3E-06	3.2E-06	2.3E-06	1.8E-06
NE	2.2E-05	2.2E-05	1.7E-05	1.4E-05	1.3E-05	8.9E-06	5.0E-06	3.1E-06	2.2E-06	1.7E-06
ENE	1.5E-05	2.2E-05	1.6E-05	1.4E-05	1.3E-05	8.9E-06	5.1E-06	3.1E-06	2.2E-06	1.7E-06
E	1.4E-05	2.2E-05	1.6E-05	1.4E-05	1.2E-05	8.4E-06	4.7E-06	2.8E-06	2.0E-06	1.5E-06
ESE	1.6E-05	2.2E-05	1.6E-05	1.4E-05	1.3E-05	8.6E-06	4.8E-06	2.9E-06	2.0E-06	1.6E-06
SE	2.3E-05	2.2E-05	1.7E-05	1.4E-05	1.3E-05	9.3E-06	5.4E-06	3.3E-06	2.3E-06	1.8E-06
SSE	2.4E-05	2.2E-05	1.7E-05	1.4E-05	1.3E-05	9.4E-06	5.5E-06	3.3E-06	2.4E-06	1.8E-06
S	2.3E-05	2.2E-05	1.7E-05	1.4E-05	1.3E-05	9.2E-06	5.3E-06	3.2E-06	2.3E-06	1.7E-06
SSW	2.1E-05	2.2E-05	1.7E-05	1.4E-05	1.3E-05	9.0E-06	5.1E-06	3.1E-06	2.2E-06	1.7E-06
SW	2.3E-05	2.2E-05	1.8E-05	1.4E-05	1.3E-05	9.3E-06	5.4E-06	3.3E-06	2.3E-06	1.8E-06
WSW	2.4E-05	2.2E-05	1.8E-05	1.4E-05	1.3E-05	9.4E-06	5.5E-06	3.3E-06	2.4E-06	1.8E-06
W	2.3E-05	2.2E-05	1.8E-05	1.4E-05	1.3E-05	9.4E-06	5.5E-06	3.3E-06	2.4E-06	1.8E-06
WNW	2.4E-05	2.2E-05	1.8E-05	1.4E-05	1.3E-05	8.9E-06	5.1E-06	3.1E-06	2.2E-06	1.7E-06
NW	2.4E-05	2.2E-05	1.7E-05	1.4E-05	1.3E-05	8.8E-06	5.0E-06	3.0E-06	2.2E-06	1.7E-06
NNW	2.5E-05	2.2E-05	1.8E-05	1.4E-05	1.3E-05	8.8E-06	5.0E-06	3.0E-06	2.1E-06	1.7E-06

Table A.2-5. Sector-Averaged Atmospheric Dispersion Coefficients (secm^{-3})
For Chronic Ground-Level Releases From the 200 Areas.

TRANSPORT DIRECTION	DISTANCE (km)									
	0.8	2.4	4.0	5.6	7.2	12	24	40	56	72
N	3.1E-06	4.8E-07	2.2E-07	1.3E-07	9.3E-08	4.5E-08	1.7E-08	8.6E-09	5.4E-09	3.9E-09
NNE	2.4E-06	3.8E-07	1.7E-07	1.1E-07	7.3E-08	3.5E-08	1.4E-08	6.8E-09	4.3E-09	3.1E-09
NE	3.1E-06	4.9E-07	2.2E-07	1.4E-07	9.4E-08	4.5E-08	1.8E-08	8.8E-09	5.6E-09	4.0E-09
ENE	4.5E-06	7.1E-07	3.2E-07	2.0E-07	1.4E-07	6.7E-08	2.6E-08	1.3E-08	8.2E-09	5.9E-09
E	7.8E-06	1.2E-06	5.7E-07	3.5E-07	2.4E-07	1.2E-07	4.5E-08	2.2E-08	1.4E-08	1.0E-08
ESE	7.9E-06	1.3E-06	5.7E-07	3.5E-07	2.4E-07	1.2E-07	4.4E-08	2.2E-08	1.4E-08	1.0E-08
SE	6.4E-06	1.0E-06	4.5E-07	2.8E-07	1.9E-07	9.1E-08	3.5E-08	1.7E-08	1.1E-08	7.8E-09
SSE	3.8E-06	6.0E-07	2.7E-07	1.6E-07	1.1E-07	5.4E-08	2.1E-08	1.0E-08	6.5E-09	4.7E-09
S	3.5E-06	5.4E-07	2.4E-07	1.5E-07	1.0E-07	4.8E-08	1.8E-08	9.0E-09	5.8E-09	4.1E-09
SSW	1.9E-06	3.0E-07	1.3E-07	8.0E-08	5.5E-08	2.6E-08	9.9E-09	4.9E-09	3.1E-09	2.2E-09
SW	1.6E-06	2.5E-07	1.1E-07	6.7E-08	4.6E-08	2.2E-08	8.3E-09	4.1E-09	2.6E-09	1.9E-09
WSW	1.5E-06	2.3E-07	1.0E-07	6.2E-08	4.3E-08	2.0E-08	7.7E-09	3.8E-09	2.4E-09	1.7E-09
W	2.4E-06	3.7E-07	1.7E-07	1.0E-07	6.9E-08	3.3E-08	1.2E-08	6.2E-09	3.9E-09	2.8E-09
WNW	2.6E-06	4.0E-07	1.8E-07	1.1E-07	7.5E-08	3.6E-08	1.4E-08	6.7E-09	4.3E-09	3.1E-09
NW	2.7E-06	4.2E-07	1.9E-07	1.2E-07	8.0E-08	3.8E-08	1.5E-08	7.2E-09	4.6E-09	3.3E-09
NNW	2.3E-06	3.7E-07	1.7E-07	1.0E-07	7.1E-08	3.4E-08	1.3E-08	6.4E-09	4.1E-09	2.9E-09

Table A.2-6. 95th Percentile Centerline Atmospheric Dispersion Coefficients (sec m^{-3}) For Acute Stack-Level (61 m) Releases From the 200 Areas.

TRANSPORT DIRECTION	DISTANCE (km)									
	0.8	2.4	4.0	5.6	7.2	12	24	40	56	72
N	9.7E-04	1.7E-04	8.4E-05	5.4E-05	3.9E-05	1.9E-05	8.5E-06	4.6E-06	3.1E-06	2.3E-06
NNE	9.3E-04	1.6E-04	8.1E-05	5.1E-05	3.7E-05	1.8E-05	8.1E-06	4.3E-06	2.9E-06	2.2E-06
NE	8.4E-04	1.5E-04	7.3E-05	4.6E-05	3.3E-05	1.6E-05	7.2E-06	3.9E-06	2.6E-06	1.9E-06
ENE	6.8E-04	1.2E-04	5.9E-05	3.7E-05	2.7E-05	1.3E-05	5.7E-06	3.0E-06	2.0E-06	1.5E-06
E	6.8E-04	1.2E-04	5.8E-05	3.7E-05	2.6E-05	1.3E-05	5.6E-06	3.0E-06	2.0E-06	1.5E-06
ESE	4.5E-04	8.0E-05	3.8E-05	2.4E-05	1.7E-05	8.0E-06	3.4E-06	1.8E-06	1.2E-06	8.3E-07
SE	4.4E-04	7.8E-05	3.7E-05	2.3E-05	1.7E-05	7.9E-06	3.4E-06	1.7E-06	1.1E-06	8.2E-07
SSE	8.1E-04	1.4E-04	7.0E-05	4.4E-05	3.2E-05	1.6E-05	6.9E-06	3.7E-06	2.4E-06	1.8E-06
S	8.4E-04	1.5E-04	7.2E-05	4.6E-05	3.3E-05	1.6E-05	7.2E-06	3.8E-06	2.6E-06	1.9E-06
SSW	7.6E-04	1.3E-04	6.5E-05	4.1E-05	3.0E-05	1.5E-05	6.4E-06	3.4E-06	2.3E-06	1.7E-06
SW	8.4E-04	1.5E-04	7.3E-05	4.6E-05	3.3E-05	1.6E-05	7.2E-06	3.9E-06	2.6E-06	1.9E-06
WSW	9.0E-04	1.6E-04	7.8E-05	5.0E-05	3.6E-05	1.8E-05	7.8E-06	4.2E-06	2.8E-06	2.1E-06
W	9.0E-04	1.6E-04	7.8E-05	5.0E-05	3.6E-05	1.8E-05	7.8E-06	4.2E-06	2.8E-06	2.1E-06
WNW	9.7E-04	1.7E-04	8.4E-05	5.4E-05	3.9E-05	1.9E-05	8.5E-06	4.5E-06	3.0E-06	2.3E-06
NW	8.8E-04	1.5E-04	7.6E-05	4.8E-05	3.5E-05	1.7E-05	7.6E-06	4.1E-06	2.7E-06	2.0E-06
NNW	9.0E-04	1.6E-04	7.8E-05	5.0E-05	3.6E-05	1.8E-05	7.8E-06	4.2E-06	2.8E-06	2.1E-06

Table A.2-7. Sector-Averaged Atmospheric Dispersion Coefficients (sec^{-3})
For Chronic Stack-Level (89 m) Releases From the 200 Areas.

TRANSPORT DIRECTION	DISTANCE (km)									
	0.8	2.4	4.0	5.6	7.2	12	24	40	56	72
N	4.8E-08	4.2E-08	3.7E-08	3.0E-08	2.5E-08	1.6E-08	8.0E-09	4.6E-09	3.1E-09	2.3E-09
NNE	3.7E-08	2.9E-08	2.5E-08	2.1E-08	1.7E-08	1.1E-08	5.8E-09	3.3E-09	2.3E-09	1.7E-09
NE	4.8E-08	3.5E-08	3.1E-08	2.6E-08	2.2E-08	1.4E-08	7.3E-09	4.3E-09	2.9E-09	2.2E-09
ENE	4.9E-08	4.5E-08	4.1E-08	3.5E-08	3.0E-08	2.0E-08	1.0E-08	6.1E-09	4.2E-09	3.2E-09
E	5.7E-08	7.3E-08	7.0E-08	6.0E-08	5.2E-08	3.5E-08	1.8E-08	1.1E-08	7.3E-09	5.5E-09
ESE	6.4E-08	9.1E-08	8.3E-08	6.9E-08	5.8E-08	3.7E-08	1.9E-08	1.1E-08	7.3E-09	5.4E-09
SE	1.1E-07	1.0E-07	8.6E-08	6.9E-08	5.6E-08	3.5E-08	1.7E-08	9.7E-09	6.6E-09	4.9E-09
SSE	1.0E-07	7.5E-08	5.8E-08	4.5E-08	3.6E-08	2.2E-08	1.0E-08	5.8E-09	3.9E-09	2.9E-09
S	1.5E-07	9.0E-08	6.5E-08	4.9E-08	3.8E-08	2.2E-08	1.0E-08	5.5E-09	3.7E-09	2.7E-09
SSW	9.8E-08	5.7E-08	4.0E-08	3.0E-08	2.3E-08	1.3E-08	5.9E-09	3.2E-09	2.1E-09	1.6E-09
SW	8.5E-08	4.5E-08	3.2E-08	2.3E-08	1.8E-08	1.0E-08	4.7E-09	2.6E-09	1.7E-09	1.3E-09
WSW	7.0E-08	3.9E-08	2.8E-08	2.1E-08	1.6E-08	9.5E-09	4.3E-09	2.4E-09	1.6E-09	1.2E-09
W	8.7E-08	5.4E-08	4.0E-08	3.1E-08	2.4E-08	1.5E-08	6.7E-09	3.7E-09	2.5E-09	1.8E-09
WNW	6.6E-08	4.9E-08	3.9E-08	3.0E-08	2.4E-08	1.4E-08	6.7E-09	3.7E-09	2.5E-09	1.8E-09
NW	5.7E-08	4.9E-08	4.0E-08	3.1E-08	2.6E-08	1.6E-08	7.7E-09	4.3E-09	2.9E-09	2.2E-09
NNW	4.4E-08	3.6E-08	3.1E-08	2.5E-08	2.1E-08	1.3E-08	6.5E-09	3.7E-09	2.5E-09	1.9E-09

Table A.2-8. 95th Percentile Centerline Atmospheric Dispersion Coefficients (sm^3) For Acute Stack-Level (61 m) Releases From the 200 Areas.

TRANSPORT DIRECTION	DISTANCE (km)									
	0.8	2.4	4.0	5.6	7.2	12	24	40	56	72
N	1.7E-05	2.2E-05	1.7E-05	1.4E-05	1.3E-05	8.7E-06	4.9E-06	2.9E-06	2.1E-06	1.6E-06
NNE	1.5E-05	2.2E-05	1.6E-05	1.4E-05	1.2E-05	8.2E-06	4.5E-06	2.7E-06	1.9E-06	1.4E-06
NE	1.3E-05	2.2E-05	1.5E-05	1.4E-05	1.2E-05	7.4E-06	3.9E-06	2.3E-06	1.6E-06	1.2E-06
ENE	9.2E-06	2.1E-05	1.4E-05	1.4E-05	1.1E-05	6.4E-06	3.1E-06	1.7E-06	1.2E-06	8.5E-07
E	9.2E-06	2.1E-05	1.4E-05	1.4E-05	1.1E-05	6.7E-06	3.3E-06	1.9E-06	1.3E-06	9.4E-07
ESE	8.7E-06	1.4E-05	1.3E-05	1.2E-05	9.1E-06	5.4E-06	2.6E-06	1.5E-06	9.8E-07	7.3E-07
SE	1.3E-05	1.8E-05	1.3E-05	1.2E-05	9.7E-06	5.5E-06	2.7E-06	1.5E-06	9.9E-07	7.4E-07
SSE	2.0E-05	2.2E-05	1.5E-05	1.4E-05	1.2E-05	7.4E-06	3.9E-06	2.3E-06	1.6E-06	1.2E-06
S	2.7E-05	2.2E-05	1.6E-05	1.4E-05	1.2E-05	7.3E-06	3.8E-06	2.2E-06	1.5E-06	1.1E-06
SSW	2.8E-05	2.2E-05	1.5E-05	1.4E-05	1.2E-05	7.1E-06	3.6E-06	2.1E-06	1.4E-06	1.1E-06
SW	2.8E-05	2.2E-05	1.6E-05	1.4E-05	1.2E-05	7.6E-06	4.0E-06	2.3E-06	1.6E-06	1.2E-06
WSW	2.7E-05	2.2E-05	1.7E-05	1.4E-05	1.2E-05	7.8E-06	4.2E-06	2.4E-06	1.7E-06	1.3E-06
W	2.7E-05	2.2E-05	1.7E-05	1.4E-05	1.3E-05	8.5E-06	4.7E-06	2.8E-06	2.0E-06	1.5E-06
WNW	2.5E-05	2.2E-05	1.7E-05	1.4E-05	1.2E-05	8.3E-06	4.6E-06	2.7E-06	1.9E-06	1.5E-06
NW	2.4E-05	2.2E-05	1.8E-05	1.4E-05	1.3E-05	8.7E-06	4.9E-06	2.9E-06	2.1E-06	1.6E-06
NNW	1.9E-05	2.2E-05	1.7E-05	1.4E-05	1.3E-05	8.8E-06	5.0E-06	3.0E-06	2.1E-06	1.6E-06

Table A.2-9. Sector-Averaged Atmospheric Dispersion Coefficients ($\text{s}\cdot\text{m}^{-3}$)
For Chronic Ground-Level Releases From the 300 Area.

TRANSPORT DIRECTION	DISTANCE (km)									
	0.8	2.4	4.0	5.6	7.2	12	24	40	56	72
N	6.5E-06	1.0E-06	4.7E-07	2.8E-07	2.0E-07	9.5E-08	3.6E-08	1.8E-08	1.2E-08	8.3E-09
NNE	4.4E-06	6.9E-07	3.1E-07	1.9E-07	1.3E-07	6.3E-08	2.4E-08	1.2E-08	7.6E-09	5.5E-09
NE	4.9E-06	7.7E-07	3.5E-07	2.1E-07	1.5E-07	7.1E-08	2.7E-08	1.3E-08	8.5E-09	6.1E-09
ENE	3.3E-06	5.2E-07	2.4E-07	1.4E-07	1.0E-07	4.8E-08	1.8E-08	9.1E-09	5.8E-09	4.1E-09
E	3.8E-06	6.0E-07	2.8E-07	1.7E-07	1.2E-07	5.6E-08	2.1E-08	1.1E-08	6.8E-09	4.8E-09
ESE	2.8E-06	4.5E-07	2.0E-07	1.2E-07	8.7E-08	4.2E-08	1.6E-08	8.0E-09	5.1E-09	3.6E-09
SE	4.0E-06	6.3E-07	2.9E-07	1.7E-07	1.2E-07	5.8E-08	2.2E-08	1.1E-08	6.9E-09	5.0E-09
SSE	5.2E-06	8.1E-07	3.7E-07	2.2E-07	1.5E-07	7.4E-08	2.8E-08	1.4E-08	8.8E-09	6.3E-09
S	5.7E-06	9.0E-07	4.1E-07	2.5E-07	1.7E-07	8.3E-08	3.1E-08	1.6E-08	9.9E-09	7.1E-09
SSW	1.4E-06	2.1E-07	9.6E-08	5.8E-08	4.0E-08	1.9E-08	7.3E-09	3.7E-09	2.4E-09	1.7E-09
SW	8.0E-07	1.2E-07	5.6E-08	3.4E-08	2.3E-08	1.1E-08	4.4E-09	2.2E-09	1.4E-09	1.0E-09
WSW	7.0E-07	1.1E-07	4.8E-08	2.9E-08	2.0E-08	9.6E-09	3.7E-09	1.8E-09	1.2E-09	8.5E-10
W	1.9E-06	2.9E-07	1.3E-07	7.8E-08	5.4E-08	2.6E-08	1.0E-08	5.1E-09	3.3E-09	2.3E-09
WNW	3.7E-06	5.8E-07	2.7E-07	1.6E-07	1.1E-07	5.4E-08	2.1E-08	1.0E-08	6.6E-09	4.7E-09
NW	5.6E-06	8.8E-07	4.0E-07	2.4E-07	1.7E-07	8.2E-08	3.1E-08	1.6E-08	1.0E-08	7.3E-09
NNW	4.6E-06	7.2E-07	3.3E-07	2.0E-07	1.4E-07	6.7E-08	2.6E-08	1.3E-08	8.3E-09	5.9E-09

Table A.2-10. 95th Percentile Centerline Atmospheric Dispersion Coefficients (sem³) Ground-Level Releases From the 300 Area.

TRANSPORT DIRECTION	DISTANCE (km)									
	0.8	2.4	4.0	5.6	7.2	12	24	40	56	72
N	1.0E-03	1.8E-04	8.6E-05	5.5E-05	3.9E-05	1.9E-05	8.7E-06	4.7E-06	3.1E-06	2.3E-06
NNE	8.1E-04	1.4E-04	7.0E-05	4.4E-05	3.2E-05	1.6E-05	6.9E-06	3.7E-06	2.5E-06	1.8E-06
NE	8.2E-04	1.5E-04	7.1E-05	4.5E-05	3.2E-05	1.6E-05	7.0E-06	3.7E-06	2.5E-06	1.8E-06
ENE	9.3E-04	1.6E-04	8.0E-05	5.1E-05	3.7E-05	1.8E-05	8.0E-06	4.3E-06	2.9E-06	2.1E-06
E	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
ESE	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
SE	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
SSE	8.1E-04	1.4E-04	6.9E-05	4.4E-05	3.2E-05	1.6E-05	6.8E-06	3.7E-06	2.4E-06	1.8E-06
S	4.4E-04	7.8E-05	3.7E-05	2.3E-05	1.7E-05	7.9E-06	3.4E-06	1.7E-06	1.1E-06	8.3E-07
SSW	5.2E-04	9.2E-05	4.4E-05	2.8E-05	2.0E-05	9.5E-06	4.1E-06	2.1E-06	1.4E-06	1.0E-06
SW	7.2E-04	1.3E-04	6.2E-05	3.9E-05	2.8E-05	1.4E-05	6.0E-06	3.2E-06	2.1E-06	1.6E-06
WSW	6.9E-04	1.2E-04	6.0E-05	3.8E-05	2.7E-05	1.3E-05	5.8E-06	3.1E-06	2.0E-06	1.5E-06
W	8.1E-04	1.4E-04	7.0E-05	4.4E-05	3.2E-05	1.6E-05	6.9E-06	3.7E-06	2.5E-06	1.8E-06
WNW	7.4E-04	1.3E-04	6.4E-05	4.0E-05	2.9E-05	1.4E-05	6.2E-06	3.3E-06	2.2E-06	1.6E-06
NW	7.6E-04	1.3E-04	6.5E-05	4.1E-05	3.0E-05	1.5E-05	6.4E-06	3.4E-06	2.3E-06	1.7E-06
NNW	9.7E-04	1.7E-04	8.4E-05	5.3E-05	3.8E-05	1.9E-05	8.4E-06	4.5E-06	3.0E-06	2.2E-06

Table A.2-11. Sector-Averaged Atmospheric Dispersion Coefficients (sec^{-3})
For Chronic Ground-Level Releases From the 400 Area.

TRANSPORT DIRECTION	DISTANCE (km)									
	0.8	2.4	4.0	5.6	7.2	12	24	40	56	72
N	6.5E-06	1.0E-06	4.6E-07	2.8E-07	2.0E-07	9.5E-08	3.6E-08	1.8E-08	1.2E-08	8.3E-09
NNE	4.4E-06	6.9E-07	3.1E-07	1.9E-07	1.3E-07	6.3E-08	2.4E-08	1.2E-08	7.7E-09	5.5E-09
NE	2.8E-06	4.4E-07	2.0E-07	1.2E-07	8.4E-08	4.0E-08	1.5E-08	7.7E-09	4.9E-09	3.5E-09
ENE	1.8E-06	2.9E-07	1.3E-07	8.0E-08	5.5E-08	2.7E-08	1.0E-08	5.1E-09	3.2E-09	2.3E-09
E	3.0E-06	4.7E-07	2.2E-07	1.3E-07	9.0E-08	4.3E-08	1.6E-08	8.2E-09	5.2E-09	3.7E-09
ESE	3.4E-06	5.4E-07	2.5E-07	1.5E-07	1.0E-07	4.9E-08	1.9E-08	9.2E-09	5.8E-09	4.2E-09
SE	4.4E-06	6.9E-07	3.2E-07	1.9E-07	1.3E-07	6.3E-08	2.4E-08	1.2E-08	7.5E-09	5.4E-09
SSE	3.5E-06	5.5E-07	2.5E-07	1.5E-07	1.1E-07	5.0E-08	1.9E-08	9.5E-09	6.1E-09	4.3E-09
S	4.5E-06	7.0E-07	3.2E-07	2.0E-07	1.4E-07	6.5E-08	2.5E-08	1.2E-08	8.0E-09	5.7E-09
SSW	2.7E-06	4.1E-07	1.9E-07	1.1E-07	8.0E-08	3.9E-08	1.5E-08	7.5E-09	4.8E-09	3.4E-09
SW	1.9E-06	3.0E-07	1.4E-07	8.2E-08	5.7E-08	2.7E-08	1.0E-08	5.2E-09	3.3E-09	2.4E-09
WSW	1.4E-06	2.2E-07	1.0E-07	6.1E-08	4.2E-08	2.0E-08	7.7E-09	3.9E-09	2.5E-09	1.8E-09
W	2.0E-06	3.1E-07	1.4E-07	8.4E-08	5.9E-08	2.8E-08	1.1E-08	5.5E-09	3.5E-09	2.5E-09
WNW	1.8E-06	2.9E-07	1.3E-07	7.9E-08	5.5E-08	2.6E-08	1.0E-08	5.0E-09	3.2E-09	2.3E-09
NW	2.4E-06	3.8E-07	1.7E-07	1.1E-07	7.3E-08	3.5E-08	1.3E-08	6.7E-09	4.3E-09	3.1E-09
NNW	3.8E-06	5.9E-07	2.7E-07	1.6E-07	1.1E-07	5.5E-08	2.1E-08	1.0E-08	6.6E-09	4.8E-09

Table A.2-12. 95th Percentile Centerline Atmospheric Dispersion Coefficients (sec^{-3}) For Acute Ground-Level Releases From the 400 Area.

TRANSPORT DIRECTION	DISTANCE (km)									
	0.8	2.4	4.0	5.6	7.2	12	24	40	56	72
N	4.4E-04	7.9E-05	3.8E-05	2.4E-05	1.7E-05	8.0E-06	3.4E-06	1.7E-06	1.1E-06	8.3E-07
NNE	4.2E-04	7.5E-05	3.6E-05	2.3E-05	1.6E-05	7.7E-06	3.3E-06	1.7E-06	1.1E-06	8.2E-07
NE	7.2E-04	1.3E-04	6.2E-05	3.9E-05	2.8E-05	1.4E-05	6.0E-06	3.2E-06	2.1E-06	1.6E-06
ENE	8.1E-04	1.4E-04	7.0E-05	4.4E-05	3.2E-05	1.6E-05	6.9E-06	3.7E-06	2.5E-06	1.8E-06
E	8.3E-04	1.5E-04	7.1E-05	4.5E-05	3.2E-05	1.6E-05	7.1E-06	3.8E-06	2.5E-06	1.9E-06
ESE	4.8E-04	8.5E-05	4.1E-05	2.6E-05	1.8E-05	8.7E-06	3.7E-06	1.9E-06	1.3E-06	9.2E-07
SE	4.4E-04	7.7E-05	3.7E-05	2.3E-05	1.6E-05	7.8E-06	3.3E-06	1.7E-06	1.1E-06	8.2E-07
SSE	7.5E-04	1.3E-04	6.5E-05	4.1E-05	2.9E-05	1.4E-05	6.3E-06	3.4E-06	2.2E-06	1.7E-06
S	8.1E-04	1.4E-04	7.0E-05	4.4E-05	3.2E-05	1.6E-05	6.9E-06	3.7E-06	2.4E-06	1.8E-06
SSW	8.3E-04	1.5E-04	7.1E-05	4.5E-05	3.2E-05	1.6E-05	7.1E-06	3.8E-06	2.5E-06	1.9E-06
SW	8.7E-04	1.5E-04	7.5E-05	4.8E-05	3.4E-05	1.7E-05	7.5E-06	4.0E-06	2.7E-06	2.0E-06
WSW	1.0E-03	1.8E-04	8.7E-05	5.5E-05	4.0E-05	2.0E-05	8.7E-06	4.7E-06	3.1E-06	2.3E-06
W	1.0E-03	1.8E-04	8.7E-05	5.6E-05	4.0E-05	2.0E-05	8.8E-06	4.7E-06	3.2E-06	2.3E-06
WNW	9.2E-04	1.6E-04	8.0E-05	5.1E-05	3.6E-05	1.8E-05	8.0E-06	4.3E-06	2.8E-06	2.1E-06
NW	7.6E-04	1.4E-04	6.6E-05	4.2E-05	3.0E-05	1.5E-05	6.4E-06	3.4E-06	2.3E-06	1.7E-06
NNW	4.4E-04	7.8E-05	3.7E-05	2.3E-05	1.7E-05	7.9E-06	3.4E-06	1.7E-06	1.1E-06	8.2E-07

APPENDIX B
COMPLIANCE EVALUATION WORKSHEETS

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Table B.1-1. Identification of WHC Control Manuals by Institutional Control and/or Safety Requirement and DOE Orders.*

Institutional control or safety requirement	DOE order and title	Applicable WHC control manual
Radiation Protection	5400.5, <i>Radiation Protection of the Public and the Environment</i>	WHC-CM-1-3, <i>Management Requirements and Procedures</i> WHC-CM-1-6, <i>WHC Radiological Control Manual</i> WHC-CM-3-5, <i>Document Control and Records Management Manual</i>
	5480.11, <i>Radiation Protection for Occupational Workers</i>	WHC-CM-4-11, <i>ALARA Program Manual</i> WHC-CM-7-5, <i>Environmental Compliance Manual</i>
	HSRCM-1, <i>Hanford Site Radiological Control Manual</i>	DOE/RL-91-49, <i>United States Department of Energy - Richland Field Office Environmental Protection Implementation Plan - November 9, 1991 to November 9, 1992</i> DOE/RL-91-50, <i>Environmental Monitoring Plan: United States Department of Energy, Richland Field Office</i> WHC-EP-0137, <i>Best Available Technology Economically Achievable Guidance Document For The Hanford Site Waste Management Systems Engineering</i> WHC-EP-0498, <i>Unit Dose Calculation Methods and Summary of Facility Effluent Monitoring Plan Determinations</i> HEDOP, <i>Hanford Environmental Dose Overview Program</i>

*DOE 5480.4, *Environmental Protection, Safety, and Health Protection Standards*, in addition to the Orders identified, provides standards that are applicable to all institutional controls and/or safety requirements.

Table B.1-1. Identification of WHC Control Manuals by Institutional Control and/or Safety Requirement and DOE Orders.*

Institutional control or safety requirement	DOE order and title	Applicable WHC control manual
ALARA	5480.11, <i>Radiation Protection for Occupational Workers</i> HSRCM-1, <i>Hanford Site Radiological Control Manual</i>	WHC-CM-1-3, <i>Management Requirements and Procedures</i> WHC-CM-1-6, <i>WHC Radiological Control Manual</i> WHC-CM-4-1, <i>Emergency Plan</i> WHC-CM-4-9, <i>Radiological Design</i> WHC-CM-4-10, <i>Radiation Protection</i> WHC-CM-4-11, <i>ALARA Program Manual</i> WHC-CM-4-16, <i>Dosimetry and Medical Services Manual</i> WHC-CM-4-43, <i>Emergency Management Procedures</i>
Occupational Safety	5483.1A, <i>Occupational Safety and Health Program for DOE Contractor Employees at Government-owned Contractor-operated Facilities</i>	WHC-CM-1-1, <i>Management Policies</i> WHC-CM-1-3, <i>Management Requirements and Procedures</i> WHC-CM-4-2, <i>Quality Assurance Manual</i> WHC-CM-4-3, <i>Industrial Safety Manual</i> WHC-CM-4-40, <i>Industrial Hygiene Manual</i>
Fire Protection	5480.7A, <i>Fire Protection</i>	WHC-CM-1-2, <i>Organization Charts and Charters</i> WHC-CM-1-3, <i>Management Requirements and Procedures</i> WHC-CM-4-3, <i>Industrial Safety Manual</i> WHC-CM-4-41, <i>Fire Protection Manual</i>
Industrial Safety	None Identified (see Occupational Safety)	

*DOE 5480.4, *Environmental Protection, Safety, and Health Protection Standards*, in addition to the Orders identified, provides standards that are applicable to all institutional controls and/or safety requirements.

Table B.1-1. Identification of WHC Control Manuals by Institutional Control and/or Safety Requirement and DOE Orders.*

Institutional control or safety requirement	DOE order and title	Applicable WHC control manual
Industrial Hygiene	5480.10, <i>Contractor Industrial Hygiene Program</i>	WHC-CM-1-1, <i>Management Policies</i> WHC-CM-1-2, <i>Organization Charts and Charters</i> WHC-CM-1-3, <i>Management Requirements and Procedures</i> WHC-CM-4-3, <i>Industrial Safety Manual</i> WHC-CM-4-40, <i>Industrial Hygiene Manual</i> WHC-CM-7-5, <i>Environmental Compliance Manual</i>
Criticality Safety	5480.5, <i>Safety of Nuclear Facilities</i> 5480.24, <i>Nuclear Criticality Safety</i>	WHC-CM-4-29, <i>Nuclear Criticality Safety Manual</i> WHC-CM-4-46, <i>Nonreactor Facility Safety Analysis Manual</i> <i>Implementation Plan for DOE Orders 5480.21, .22, and .23</i>
Training for Nuclear Facilities	5480.18A, <i>Accreditation of Performance-based Training for Category A Reactors and Nuclear Facilities</i> 5480.20, <i>Personnel Selection, qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities</i>	WHC-CM-1-1, <i>Management Policies</i> WHC-CM-1-2, <i>Organization Charts and Charters</i> WHC-CM-1-3, <i>Management Requirements and Procedures</i> WHC-CM-1-5, <i>Standard Operating Procedures</i> WHC-CM-2-15, <i>Training Administration Manual</i> WHC-CM-4-1, <i>Emergency Plan</i> WHC-CM-4-3, <i>Industrial Safety Manual</i> WHC-CM-4-33, <i>Security Manual</i> WHC-SP-0329, <i>400 Area Training Plans</i>

*DOE 5480.4, *Environmental Protection, Safety, and Health Protection Standards*, in addition to the Orders identified, provides standards that are applicable to all institutional controls and/or safety requirements.

Table B.1-1. Identification of WHC Control Manuals by Institutional Control and/or Safety Requirement and DOE Orders.*

Institutional control or safety requirement	DOE order and title	Applicable WHC control manual
Radioactive Waste Management	5400.5, <i>Radiation Protection of the Public and the Environment</i> 5820.2A, <i>Radioactive Waste Management</i>	WHC-CM-1-1, <i>Management Policies</i> WHC-CM-1-3, <i>Management Requirements and Procedures</i> WHC-CM-1-6, <i>Radiological Control Manual</i> WHC-CM-2-14, <i>Hazardous Material Packaging and Shipping</i> WHC-CM-3-5, <i>Document Control and Records Management Manual</i> WHC-CM-4-2, <i>Quality Assurance Manual</i> WHC-CM-4-3, <i>Industrial Safety Manual</i> WHC-CM-4-9, <i>Radiological Design</i> WHC-CM-4-11, <i>ALARA Program Manual</i> WHC-CM-4-29, <i>Nuclear Criticality Safety Manual</i> WHC-CM-4-46, <i>Nonreactor Facility Safety Analysis Manual</i> WHC-CM-5-16, <i>Solid Waste Management</i> WHC-CM-6-1, <i>Standard Engineering Practices</i> WHC-CM-7-5, <i>Environmental Compliance Manual</i> WHC-EP-0063-3, <i>Hanford Site Solid Waste Acceptance Criteria</i> WHC-EP-0231, <i>Hanford Surplus Facilities Program Plan - Fiscal Year 1989</i> WHC-EP-0496, <i>Westinghouse Hanford Company Waste Minimization and Pollution Preventive Awareness Program Plan</i>

*DOE 5480.4, *Environmental Protection, Safety, and Health Protection Standards*, in addition to the Orders identified, provides standards that are applicable to all institutional controls and/or safety requirements.

Table B.1-1. Identification of WHC Control Manuals by Institutional Control and/or Safety Requirement and DOE Orders.*

Institutional control or safety requirement	DOE order and title	Applicable WHC control manual
Occurrence Reporting	5000.3B, <i>Occurrence Reporting and Processing of Operations Information</i> 5480.26, <i>Trending and Analysis of Operations Using Performance Indicators</i>	WHC-CM-1-3, <i>Management Requirements and Procedures</i> WHC-CM-1-4, <i>Corrective Action Management Manual</i>
Quality Assurance	5700.6C, <i>Quality Assurance</i>	WHC-CM-1-1, <i>Management Policies</i> WHC-CM-1-2, <i>Organization Charts and Charters</i> WHC-CM-1-3, <i>Management Requirements and Procedures</i> WHC-CM-4-2, <i>Quality Assurance Manual</i>

*DOE 5480.4, *Environmental Protection, Safety, and Health Protection Standards*, in addition to the Orders identified, provides standards that are applicable to all institutional controls and/or safety requirements.

Table B.1-1. Identification of WHC Control Manuals by Institutional Control and/or Safety Requirement and DOE Orders.*

Institutional control or safety requirement	DOE order and title	Applicable WHC control manual
Configuration Management	<p>4330.4A, <i>Maintenance Management Program</i></p> <p>5480.21, <i>Unreviewed Safety Questions</i></p> <p>5480.22, <i>Technical Safety Requirements</i></p> <p>5480.23, <i>Nuclear Safety Analysis Reports</i></p> <p>6430.1A, <i>General Design Criteria</i></p>	<p>WHC-CM-1-3, <i>Management Requirements and Procedures</i></p> <p>WHC-CM-4-46, <i>Nonreactor Facility Safety Analysis Manual</i></p> <p>WHC-CM-6-32, <i>Safety and Engineering Work Procedures</i></p> <p>WHC-SP-0866, <i>Westinghouse Hanford Company Conduct of Maintenance Manual</i></p> <p><i>Implementation Plan for DOE Orders 5480.21, .22, and .23</i></p>
Conduct of Operations	5480.19, <i>Conduct of Operations Requirements for DOE Facilities</i>	<p>WHC-CM-1-1, <i>Management Policies</i></p> <p>WHC-SP-0708, <i>Westinghouse Hanford Company Conduct of Operations Manual - GOCO Cross Cultivation Committee - Operational Excellence Task Force</i></p>
Emergency Planning	<p>5500.2B, <i>Emergency Categories, Classes, and Notification and Reporting Requirements</i></p> <p>5500.3A, <i>Planning and Preparedness for Operational Emergencies</i></p>	<p>WHC-CM-1-2, <i>Organizations Charts and Charters</i></p> <p>WHC-CM-1-3, <i>Management Requirements and Procedures</i></p> <p>WHC-CM-4-1, <i>Emergency Plan</i></p> <p>WHC-CM-4-33, <i>Security Manual</i></p> <p>WHC-CM-4-43, <i>Emergency Management Procedures</i></p> <p>WHC-CM-4-44, <i>Emergency Preparedness Administration</i></p> <p>WHC-IP-0628, <i>Facility Drill Guide</i></p>

*DOE 5480.4, *Environmental Protection, Safety, and Health Protection Standards*, in addition to the Orders identified, provides standards that are applicable to all institutional controls and/or safety requirements.

Table B.1-1. Identification of WHC Control Manuals by Institutional Control and/or Safety Requirement and DOE Orders.*

Institutional control or safety requirement	DOE order and title	Applicable WHC control manual
Environmental Protection	<p>5400.1, <i>General Environmental Protection Program</i></p> <p>5400.5, <i>Radiation Protection of the Public and the Environment</i></p> <p>5484.1, <i>Environmental Protection, Safety, and Health Protection Information Reporting Requirements</i></p>	<p>WHC-CM-1-2, <i>Organization Charts and Charters</i></p> <p>WHC-CM-1-3, <i>Management Requirements and Procedures</i></p> <p>WHC-CM-1-6, <i>WHC Radiological Control Manual</i></p> <p>WHC-CM-4-2, <i>Quality Assurance Manual</i></p> <p>WHC-CM-4-3, <i>Industrial Safety Manual</i></p> <p>WHC-CM-7-5, <i>Environmental Compliance Manual</i></p> <p>DOE/RL-89-12, <i>Hanford Site Groundwater Protection Management Program</i></p> <p>DOE/RL-89-18, <i>United States Department of Energy - Richland Operations Office Environmental Protection Implementation Plan - November 9, 1989 to November 19, 1990</i></p> <p>DOE/RL-91-49, <i>United States Department of Energy - Richland Field Office Environmental Protection Implementation Plan - November 9, 1991 to November 9, 1992</i></p> <p>DOE/RL-91-50, <i>Environmental Monitoring Plan: United States Department of Energy, Richland Field Office</i></p> <p>WHC-EP-0137, <i>Best Available Technology Economically Achievable Guidance Document For The Hanford Site Waste Management Systems Engineering</i></p> <p>WHC-EP-0438, <i>A Guide for Preparing Hanford Facility Effluent Monitoring Plans</i></p> <p>WHC-EP-0498, <i>Unit Dose Calculation Methods and Summary of Facility Effluent Monitoring Plan</i></p> <p>HEDOP, <i>Hanford Environmental Dose Overview Program</i></p>
SEN-35-91	Nuclear Safety Policy	WHC-CM-1-3, <i>Management Requirements and Procedures</i>

*DOE 5480.4, *Environmental Protection, Safety, and Health Protection Standards*, in addition to the Orders identified, provides standards that are applicable to all institutional controls and/or safety requirements.

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DOE Order 4330.4A, Maintenance Management Program

The following Reference(s) have been cited in the attached DOE Order 4330.4A, "Maintenance Management Program", Compliance Assessment.

WHC-SP-0866, *Westinghouse Hanford Company Conduct of Maintenance Manual*, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
11.a.	Each DOE contractor shall be required to develop, implement, and document a program to ensure that maintenance activities are conducted to preserve or restore the availability, operability, and reliability of plant structures, systems, and components important to safe and reliable operation of the facility.	WHC-SP-0866
11.a.(1)	The program shall clearly define: The structures, systems, and components included, using a graded approach based on safety and programmatic concerns. For DOE nuclear facilities, this approach includes Safety Class Items defined in Section 1300-3.2, page 13-4 of reference c. It also includes the requirements derived from Technical Specifications or Operations Safety Requirements.	WHC-SP-0866
11.a.(2)	The program shall clearly define: The management systems used to control those activities, including the means for monitoring and measuring the effectiveness of the program and the management of maintenance backlog.	WHC-SP-0866
11.a.(3)	The program shall clearly define: The assignment of responsibilities and authority for all levels of the maintenance organization.	WHC-SP-0866
11.a.(4)	The program shall clearly define: Mechanisms for feedback of relevant information, such as trend analysis and instrumentation performance/reliability data, to identify necessary program modifications.	WHC-SP-0866
11.a.(5)	The program shall clearly define: Provisions for identification, evaluation, and correction of possible component, system design, quality assurance, or other relevant problems.	WHC-SP-0866
11.a.(6)	The program shall clearly define: Performance indicators and criteria to be utilized to measure equipment, systems, and personnel effectiveness in maintenance activities.	WHC-SP-0866
11.a.(7)	The program shall clearly define: Interfaces between maintenance and other organizations (i.e., operations, engineering, quality, and safety).	WHC-SP-0866
11.a.(8)	The program shall clearly define: A self-assessment program to monitor the effectiveness and efficiency of the maintenance program.	WHC-SP-0866
11.a.(9)	The program shall clearly define: Provisions for planning, scheduling, and coordination of maintenance activities.	WHC-SP-0866
11.b.[1]	Periodic examinations of structures, systems, components, and equipment, particularly those important to the safe and reliable operation of a facility, shall be performed to determine whether deterioration is taking place and to identify and address technical obsolescence that threatens performance, safety, or facility preservation.	WHC-SP-0866
11.b.[2]	Where the potential is identified for any event or condition to significantly affect safety margins, a formal program for resolving the problem shall be documented and implemented. These periodic examinations include both the condition assessment surveys addressed in this Order, as well as other facility inspections/appraisals required under Paragraphs 5d and e of this Order.	WHC-SP-0866
11.d.[1]	For DOE nuclear facilities, a graded approach shall be used to determine the depth of detail required and magnitude of resources expended for each maintenance program element described in Chapter II. Sound engineering judgment and knowledge of the facility are essential in the application of the graded approach, with proper consideration given to each program element's importance to safety and reliability, safeguards and security, programmatic mission, and facility specific requirements.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
11.d.[2]	For each DOE nuclear facility, the maintenance program shall be described in a Maintenance Implementation Plan (MIP), which addresses the 18 elements (excluding the introduction) in the sequence and format of Chapter II.	WHC-SP-0866
11.d.[3]	DOE nuclear facility maintenance programs may include facility-related nonnuclear equipment provided the MIP clearly identifies all equipment (or systems) and distinguishes any nonnuclear equipment/systems where a secondary graded approach applies.	WHC-SP-0866
11.d.[4]	For those DOE nuclear facilities where deviations from the maintenance program elements are considered necessary and appropriate (or not applicable), such deviations (or nonapplicable elements) shall be identified in the MIP with supporting rationale.	WHC-SP-0866
1.3.1.1a.	The maintenance organization functions and responsibilities are defined thoroughly and an appropriate staff assigned to ensure effective and timely accomplishment of the required work and to prevent the potential for waste, fraud, and error.	WHC-SP-0866
1.3.1.1b.	Engineering and technical support functions have direct and continuous interface with the maintenance organization in order to provide support in determining the cause of repetitive equipment failures and to investigate the root cause of unplanned events.	WHC-SP-0866
1.3.1.1c.	Engineering and technical support functions incorporate the following into all maintenance activities: manufacturers' recommendations, specifications for operability, action levels, acceptance criteria, procurement specifications, installation and test requirements, and test equipment and procedures.	WHC-SP-0866
1.3.1.1d.	Engineering and technical support functions identify and evaluate potential degradation mechanisms caused by environment and service over time and provide direction for timely mitigation of their effects.	WHC-SP-0866
1.3.1.1e.	Contracted maintenance services are controlled and overseen to ensure that contracted work is performed to the same standard established for the maintenance organization.	WHC-SP-0866
1.3.1.1f.	Contracted personnel are qualified for the work they are to perform.	WHC-SP-0866
1.3.1.1g.	The Quality Assurance (QA) and Quality Control (QC) programs are applied to maintenance activities commensurate with their safety and security significance.	WHC-SP-0866
1.3.1.1h.	Working relationships are developed among all interfacing organizations supporting the maintenance function.	WHC-SP-0866
1.3.1.1i.	Authority, responsibility, and accountability for support organization is defined by identifying personnel interfaces, periodic self-assessments, procedural interfaces, overall maintenance performance indicators, and indicators related to the support of maintenance tracked by each supporting group.	WHC-SP-0866
1.3.1.1j.	The organization achieves a high level of performance in maintenance by effective implementation and control of maintenance activities.	WHC-SP-0866
1.3.1.1k.	The organization provides time for and emphasizes long-range planning.	WHC-SP-0866
1.3.1.1l.	Maintenance personnel are held accountable for their performance through supervisory counseling, performance appraisals, and when necessary, disciplinary measures.	WHC-SP-0866
1.3.1.1m.	Maintenance staffing and resources are sufficient to accomplish assigned tasks, including time for training.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.1.1n.	Entry-level criteria is established to ensure that maintenance personnel have the requisite background and experience to be trainable for work in facilities.	WHC-SP-0866
1.3.1.1o.	Position incumbents meet the prescribed job qualifications requirements.	WHC-SP-0866
1.3.1.1p.	Appropriate job qualification requirements are established for all facility maintenance positions affecting the safe and reliable operation of facilities.	WHC-SP-0866
1.3.1.1q.	Maintenance job qualification requirements are periodically reviewed, evaluated, and revised, as necessary.	WHC-SP-0866
1.3.1.1r.	Adequate engineering and technical support personnel are readily available.	WHC-SP-0866
1.3.1.1s.	High quality personnel are recruited for temporary increases in staff to support planned outages or other activities.	WHC-SP-0866
1.3.1.1t.	Timely action is taken to anticipate and fill maintenance vacancies, and long-range maintenance staffing plans are developed.	WHC-SP-0866
1.3.1.1u.	Appropriate career progression plans are used to develop the management, supervisory, and technical expertise of personnel and thus help to ensure that future maintenance staff vacancies are filled with qualified personnel.	WHC-SP-0866
1.3.1.2a.	The conduct of maintenance activities in a facility is documented, as necessary, to provide for systematic, coordinated, and accurate implementation consistent with maintenance policies, goals, and objectives.	WHC-SP-0866
1.3.1.2b.	Sufficient staff, equipment, and funding is requested, justified, and available so that the maintenance organization can effectively perform its function and adequately train maintenance personnel.	WHC-SP-0866
1.3.1.2c.	Administrative work control functions are documented in policies, procedures, and checklists.	WHC-SP-0866
1.3.1.2d.	Maintenance procedures establish the responsibility for maintenance, accountability for work, authority, lines of communication, documentation requirements, required references, and means of review, approval, and updating.	WHC-SP-0866
1.3.1.2e.	Maintenance procedures define the maintenance program and standards for maintenance activities.	WHC-SP-0866
1.3.1.2f.	The maintenance program and maintenance standards are communicated to the working level by training workers in good work practices and by supervisors who observe and guide work activities.	WHC-SP-0866
1.3.1.2h.	Administrative controls are employed in the conduct of facility maintenance activities.	WHC-SP-0866
1.3.1.2i.	Oral and written communications are effective within the maintenance organization between the maintenance organization and such supporting groups as operations, safety, and engineering.	WHC-SP-0866
1.3.1.2j.	The communication necessary to develop working relationships and keep personnel at all levels cognizant of the information needed in order to perform their function is defined in the maintenance program documents.	WHC-SP-0866
1.3.1.2k.	Technical issues associated with maintenance are identified and resolved with involved organizations.	WHC-SP-0866
1.3.1.2l.	Rewards and other forms of recognition are given to maintenance personnel for superior performance.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.1.2m.	Maintenance personnel involved in significant or frequent violations of requirements are encouraged to improve through counseling, by remedial training, or by disciplinary measures, as appropriate.	
1.3.1.2n.	Performance appraisals and routine personnel feedback with supervisors or managers are utilized to enhance individual employee performance.	WHC-SP-0866
1.3.1.2o.	Personnel are encouraged to develop methods to improve safety, reliability, quality, and productivity through such activities as employee participation programs.	WHC-SP-0866
1.3.1.2p.	Commitments are routinely met. Open commitment status is tracked and up-to-date.	WHC-SP-0866
1.3.1.2q.	Performance indicators are reviewed and used to improve maintenance performance.	WHC-SP-0866
1.3.1.2r.	Long-range planning of major maintenance activities and facility outages establish a scope for funding and staff resources to meet the needs of the maintenance program.	WHC-SP-0866
1.3.1.3a.	Policies define the maintenance organization, establish administrative objectives and levels of responsibility, and generally serve to consistently regulate and guide the conduct of maintenance activities.	WHC-SP-0866
1.3.1.3b.	Maintenance personnel are assigned responsibility for achievement of specific objectives and understand the actions necessary, within the scope of their duties and responsibilities, to achieve these objectives.	WHC-SP-0866
1.3.1.3c.	Maintenance goals are developed and used to improve maintenance performance and for measuring maintenance effectiveness.	WHC-SP-0866
1.3.1.3d.	Maintenance objectives are challenging, stated in measurable terms, and address areas where improvement is needed.	WHC-SP-0866
1.3.1.3e.	Maintenance goals such as the following are established to: <ul style="list-style-type: none"> - Minimize the impact on planned outages by planning and completing maintenance activities in a timely manner; - Minimize the number of forced outages; - Minimize unplanned challenged to critical systems; - Minimize the lost-time accident rate; - Minimize facility and equipment downtime; - Minimize personnel errors; - Reduce repeat maintenance work requests (rework); - Complete scheduled surveillances and preventive maintenance activities in a timely manner; - Manage the corrective maintenance backlog to minimize the backlog and completion time of outstanding deficiencies; - Control overtime; - Staff and train the maintenance organization; - Complete outage and nonoutage work on schedule. 	WHC-SP-0866
1.3.1.3f.	Goals are substantive in nature, challenging the capability and ingenuity of the maintenance manager.	WHC-SP-0866
1.3.1.3g.	Goals and objectives are attainable and are not to be considered "sacred." Initial objectives are revised if proven unfeasible, irrelevant, or impossible.	WHC-SP-0866
1.3.1.3h.	Effective safety programs are implemented with clearly defined policies, procedures, and responsibilities to protect maintenance personnel.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.1.3i.	Policies, procedures, and responsibilities clearly define the quality assurance and quality control program interface with maintenance.	WHC-SP-0866
1.3.1.4a.	The responsibility for establishing, maintaining, and implementing the maintenance training programs is defined, understood, and coordinated between the maintenance and training organizations.	WHC-SP-0866
1.3.1.4b.	Maintenance training programs are defined and encompass managerial, supervisory, planner/scheduler, engineering, and craft personnel.	WHC-SP-0866
1.3.1.4c.1.	Initial training, consisting of classroom and on-the-job training, develops necessary job-related knowledge and skills and includes areas such as the following: Basic technical and applied science subjects.	WHC-SP-0866
1.3.1.4c.2.	Initial training, consisting of classroom and on-the-job training, develops necessary job-related knowledge and skills and includes areas such as the following: Maintenance fundamentals and troubleshooting and repair techniques.	WHC-SP-0866
1.3.1.4c.3.	Initial training, consisting of classroom and on-the-job training, develops necessary job-related knowledge and skills and includes areas such as the following: Facility systems and components.	WHC-SP-0866
1.3.1.4c.4.	Initial training, consisting of classroom and on-the-job training, develops necessary job-related knowledge and skills and includes areas such as the following: Special maintenance craft skills.	WHC-SP-0866
1.3.1.4c.5.	Initial training, consisting of classroom and on-the-job training, develops necessary job-related knowledge and skills and includes areas such as the following: Practical factor demonstration.	WHC-SP-0866
1.3.1.4c.6.	Initial training, consisting of classroom and on-the-job training, develops necessary job-related knowledge and skills and includes areas such as the following: Work-control procedures.	WHC-SP-0866
1.3.1.4c.7.	Initial training, consisting of classroom and on-the-job training, develops necessary job-related knowledge and skills and includes areas such as the following: Industrial safety, including hazards associated with work on specific equipment/systems and emergency response.	WHC-SP-0866
1.3.1.4c.8.	Initial training, consisting of classroom and on-the-job training, develops necessary job-related knowledge and skills and includes areas such as the following: Quality assurance and quality control.	WHC-SP-0866
1.3.1.4c.9.	Initial training, consisting of classroom and on-the-job training, develops necessary job-related knowledge and skills and includes areas such as the following: Maintenance procedures and job-specific work practices, including surveillance procedures.	WHC-SP-0866
1.3.1.4c.10.	Initial training, consisting of classroom and on-the-job training, develops necessary job-related knowledge and skills and includes areas such as the following: In-house and DOE-wide operating experience, including actual events.	WHC-SP-0866
1.3.1.4c.11.	Initial training, consisting of classroom and on-the-job training, develops necessary job-related knowledge and skills and includes areas such as the following: Emergency response.	WHC-SP-0866
1.3.1.4d.1.	Continuing training maintains and improves job-related knowledge and skills in areas such as the following: Facility system and component changes.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.1.4d.2.	Continuing training maintains and improves job-related knowledge and skills in areas such as: Procedure changes.	WHC-SP-0866
1.3.1.4d.3.	Continuing training maintains and improves job-related knowledge and skills in areas such as the following: DOE-wide and in-house operating experiences, including facility operation.	WHC-SP-0866
1.3.1.4d.4.	Continuing training maintains and improves job-related knowledge and skills in areas such as the following: Seldom-used knowledge and skills that affect safe and reliable facility operation.	WHC-SP-0866
1.3.1.4d.5.	Continuing training maintains and improves job-related knowledge and skills in areas such as the following: Selected topics from c above to correct identified weaknesses.	WHC-SP-0866
1.3.1.4e.1.	Maintenance organization support and guidance for maintenance training programs normally includes all or portions of the following tasks: Defining the jobs, tasks, skill levels, and responsibilities and identifying individuals to fill these positions;	WHC-SP-0866
1.3.1.4e.2.	Maintenance organization support and guidance for maintenance training programs normally includes all or portions of the following tasks: Defining training programs for each position;	WHC-SP-0866
1.3.1.4e.3.	Maintenance organization support and guidance for maintenance training programs normally includes all or portions of the following tasks: Determining the content and emphasis of the training needed;	WHC-SP-0866
1.3.1.4e.4.	Maintenance organization support and guidance for maintenance training programs normally includes all or portions of the following tasks: Determining and supporting training schedules;	WHC-SP-0866
1.3.1.4e.5.	Maintenance organization support and guidance for maintenance training programs normally includes all or portions of the following tasks: Determining the training needs or and tailoring the training program for each individual based on his previous education, training, experience, and skill level;	WHC-SP-0866
1.3.1.4e.6.	Maintenance organization support and guidance for maintenance training programs normally includes all or portions of the following tasks: Providing instructors and trainers;	WHC-SP-0866
1.3.1.4e.7.	Maintenance organization support and guidance for maintenance training programs normally includes all or portions of the following tasks: Establishing qualification criteria, with emphasis on successful performance in the field;	WHC-SP-0866
1.3.1.4e.8.	Maintenance organization support and guidance for maintenance training programs normally includes all or portions of the following tasks: Coordinating the conduct of and instruction during on-the-job training;	WHC-SP-0866
1.3.1.4e.9.	Maintenance organization support and guidance for maintenance training programs normally includes all or portions of the following tasks: Providing effectiveness feedback to the training organizations to enhance and, where necessary, adjust course teaching methods, content, and emphasis.	WHC-SP-0866
1.3.1.4g.	A formal part of the maintenance training program is on-the-job training (OJT), in which facility personnel achieve learning objectives through practical hands-on training conducted within the job environment.	WHC-SP-0866
1.3.1.4h.	OJT is conducted in accordance with formally defined training programs that specifically identify items the trainee must accomplish.	WHC-SP-0866
1.3.1.4i.	OJT is conducted by personnel who have successfully qualified as OJT Trainers.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.1.4j.	When trainees perform maintenance on installed equipment, a qualified OJT instructor observes the work so that the trainee properly accomplishes the activity and understands how to avoid errors that could affect personnel safety or adversely impact the facility.	WHC-SP-0866
1.3.1.4k.	The number of trainees to simultaneously participate in any OJT is limited in order to ensure that each trainee receives effective and adequate instruction.	WHC-SP-0866
1.3.1.4l.	Trainees independently perform maintenance only on facility equipment for which they are qualified.	WHC-SP-0866
1.3.1.4m.	Qualification standards and evaluation methods are adequate to verify trainee competence for formal qualification approval and documentation.	WHC-SP-0866
1.3.1.4n.	Maintenance Managers are directly involved in approving and periodically reviewing the maintenance training program.	WHC-SP-0866
1.3.1.4o.[1]	Training programs are systematically improved to ensure that trainees develop the required skills and knowledge.	WHC-SP-0866
1.3.1.4o.[2]	Feedback from job performance is used to help evaluate and refine maintenance skills.	WHC-SP-0866
1.3.1.4p.[1]	Management and supervisory training include generic areas such as managerial and supervisory skills, accountability, assessment and observation of routine activities, communication skills, teamwork, and company management philosophies.	WHC-SP-0866
1.3.1.4p.[2]	Position-specific training is provided to first-line supervisors.	WHC-SP-0866
1.3.2.1	To establish and conduct periodic inspections of equipment and facilities, assuring that proper condition, cleanliness, and housekeeping are maintained to support safe and reliable facility operations.	WHC-SP-0866
1.3.2.1a.	To display clearly the standard for facility condition, facility managers and supervisors are personally conducting periodic walkdowns and inspections to identify deficiencies and housekeeping discrepancies.	WHC-SP-0866
1.3.2.1b.	Equipment and facility condition, cleanliness, and housekeeping standards are established and communicated to all maintenance personnel.	WHC-SP-0866
1.3.2.1c.	Adherence to these standards are assessed through the conduct of routine periodic inspections by managers and supervisors.	WHC-SP-0866
1.3.2.1d.	Temporary environmental protection (e.g., from dust, humidity, freeze, and shock) is provided for facility equipment when needed to support construction, outage, or maintenance activities.	WHC-SP-0866
1.3.2.1e.	Appropriate facility maintenance personnel are aware of facility condition standards and are trained in the techniques required to perform condition inspections.	WHC-SP-0866
1.3.2.1f.	Condition inspection procedures define expected standards, provide for documentation of deficiencies, provide for followup on deficiency corrective actions, assign responsibilities for program implementation, and establish means to measure program effectiveness.	WHC-SP-0866
1.3.2.1g.	Inspection areas are assigned so that the entire facility is inspected, including radiation and locked areas with difficult access.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.2.1h.	Checklists of the equipment to be inspected and types of problems to look for are available as guides for the inspectors.	WHC-SP-0866
1.3.2.1i.	Schedules for the performance of routine periodic inspections are established and identify the area(s) to be inspected as well as periodic rotation for inspectors.	WHC-SP-0866
1.3.2.1j.	The results of each inspection is transmitted to the facility manager and maintenance manager.	WHC-SP-0866
1.3.2.1k.	Significant condition or safety deficiencies are immediately reported to the appropriate supervisor for near-term attention.	WHC-SP-0866
1.3.2.1l.	Facility deficiencies found are entered into the work control system for correction.	WHC-SP-0866
1.3.2.1m.	Identified deficiencies are corrected in a timely manner so that facility personnel can see the positive results of the inspection program.	WHC-SP-0866
1.3.2.1n.	Personnel are assigned corrective action and deficiencies are tracked to completion.	WHC-SP-0866
1.3.2.1o.	Reported deficiencies are monitored to identify recurring, generic, and long-term problems.	WHC-SP-0866
1.3.2.2a.	Condition Assessment Surveys (facility inspections) range from simple, visual walk-through-type assessments to in-depth studies using a variety of technical diagnostic techniques.	WHC-SP-0866
1.3.2.2b.	The primary objective of the condition assessment survey program is the early detection of potential facility problems in order to prevent deterioration, possible damage to adjacent materials or systems, and failure of components.	WHC-SP-0866
1.3.2.2c.	The standards and procedures that are the basis for condition assessments are reflected in checklists that prompt and assist the inspection team in the deficiency identification process.	WHC-SP-0866
1.3.2.2d.	The condition assessment process is standardized and performed on a predetermined basis, ranging from quarterly to every 3 years, by individuals trained to recognize and identify symptoms of facility problems.	
1.3.2.2e.	Particular attention is given to potential problem areas such as interfaces between components, especially with respect to different systems or components by different manufacturers or suppliers.	
1.3.2.2f.	After the identification of symptoms of problems or deficiencies, a diagnostic analysis is performed to determine whether there is, in fact, a problem, the nature and extent of the problem and options for corrective action.	
1.3.2.2g.	Personnel performing diagnostic analysis have technical knowledge of the systems, equipment, or components involved, and frequently of the materials used in construction and maintenance.	
1.3.2.2h.	The diagnostic analysis is based on logical, standardized, professionally developed procedures, ensuring that identified deficiencies are efficiently and correctly evaluated.	
1.3.2.2j.	Condition assessment surveys are conducted by dedicated teams that may include architects, engineers, inspectors, consultants, or others trained for the job.	

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
I.3.3.1a.(1)	A maintenance plan describing the required maintenance activities by functional unit of site infrastructure is developed and annually updated by each site contractor performing maintenance to integrate maintenance activities for which they are responsible.	WHC-SP-0866
I.3.3.1a.(2)	The maintenance plan is also a narrative description of the contractor's maintenance management program and addresses all elements of a successful maintenance program.	WHC-SP-0866
I.3.3.1b.(1)	Maintenance items to be included in the maintenance plan are those classical maintenance and repair activities funded by operating expense accounts. In general, those costs include labor and associated supervision materials as well as other indirect and overhead-funded activities. Also included are preventive, corrective, predictive, and emergency maintenance and support functions such as inspections, administration, engineering, and training.	WHC-SP-0866
I.3.3.1c.	The maintenance plan describes the strategy to monitor and control the maintenance backlog to ensure that facilities are adequately maintained.	WHC-SP-0866
I.3.3.1d.	After the scope of major maintenance activities are established as required, funding and staff resources are estimated to meet the needs of the maintenance program.	WHC-SP-0866
I.3.3.1e.1.	Long-range planning encompasses items such as the following: Recurring major maintenance items such as turbine overhaul, steam generator inspections, and major pump rebuilds;	WHC-SP-0866
I.3.3.1e.2.	Long-range planning encompasses items such as the following: Timing of planned maintenance and downtime;	WHC-SP-0866
I.3.3.1e.3.	Long-range planning encompasses items such as the following: Significant projects and modifications;	WHC-SP-0866
I.3.3.1e.4.	Long-range planning encompasses items such as the following: Future organizational structure and staffing changes aimed at continuing improvements in the maintenance program and the facility as a whole;	WHC-SP-0866
I.3.3.1e.5.	Long-range planning encompasses items such as the following: Planning for equipment replacement as components reach the end of their service life;	WHC-SP-0866
I.3.3.1e.6.	Long-range planning encompasses items such as the following: Timing of outages for the other facilities in the system when reliance on them for resources is part of the maintenance plan;	WHC-SP-0866
I.3.3.1e.7.	Long-range planning encompasses items such as the following: Regulatory issues and events that will change or impact the maintenance program; and	WHC-SP-0866
I.3.3.1e.8.	Long-range planning encompasses items such as the following: Budget changes or projects that may divert major dollars from maintenance activities.	WHC-SP-0866
I.3.4.1a.	A work request (order) system is established that clearly identifies the work needed and provides instructions to perform the work.	WHC-SP-0866
I.3.4.1b.(1)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Number sequencing;	WHC-SP-0866
I.3.4.1b.(2)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Equipment and component identification;	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.4.1b.(3)	The work request form (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Description of symptom, problem or work requested and the responsible person identifying them;	WHC-SP-0866
1.3.4.1b.(4)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Identification of crafts required;	WHC-SP-0866
1.3.4.1b.(5)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Dating of document package;	WHC-SP-0866
1.3.4.1b.(6)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Job priority;	WHC-SP-0866
1.3.4.1b.(7)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Personnel safety;	WHC-SP-0866
1.3.4.1b.(8)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Identification of the safety class of equipment or components or qualification requirements (such as environmental and seismic qualifications);	WHC-SP-0866
1.3.4.1b.(9)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Applicable Technical Specification/Operational Safety Requirements, time restraints, and associated limiting conditions for operation;	WHC-SP-0866
1.3.4.1b.(10)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Identification of special process requirements (such as special work permits, special work instructions, special training, and personnel qualification requirements);	WHC-SP-0866
1.3.4.1b.(11)	The work request forms (work packages) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Work instructions, hold points to allow inspections, special requirements, use of special materials or tools, test instrument ranges, accuracy, and clean-up requirements;	WHC-SP-0866
1.3.4.1b.(12)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Required post-maintenance testing, inspections, and acceptance criteria;	WHC-SP-0866
1.3.4.1b.(13)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Work supervisor or appropriate person in charge;	WHC-SP-0866
1.3.4.1b.(14)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Applicable operating and maintenance procedures;	WHC-SP-0866
1.3.4.1b.(15)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Description of work performed, as-found conditions, repairs made, cause-of-failure evaluations, identification of special tools and parts, calibration data, set points, adjustments made, and as-left conditions;	WHC-SP-0866
1.3.4.1b.(16)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Cost code to which work performed is to be charged;	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
I.3.4.1b.(17)	The work request forms (work package) for facilities provide procedures and guidance for performing the work and allow documentation for the following: Final reviews and sign-offs by maintenance, quality control, and other groups in the review process.	WHC-SP-0866
I.3.4.1c.	The work request system provides a method of for tracking work in process.	WHC-SP-0866
I.3.4.1d.	A procedure is established for performing and documenting emergency maintenance.	WHC-SP-0866
I.3.4.1e.	The work request (order) system provides for control of modifications, in-service tests, preventive maintenance (PM), and surveillances.	WHC-SP-0866
I.3.4.2a.	Planning maintenance activities is accomplished by a dedicated planning staff or by maintenance supervisors at facilities with small staffs. If done by a supervisor, the workload allows time to supervise work in progress.	WHC-SP-0866
I.3.4.2b.	Adequate procedural controls are established and implemented to assure adequate job planning.	WHC-SP-0866
I.3.4.2c.	In-depth work planning is utilized to identify the required support and detailed scoping necessary to accurately schedule daily maintenance.	WHC-SP-0866
I.3.4.2d.	Involvement of such required support groups as operations (see reference 1), engineering, and quality control are coordinated to effectively support the maintenance effort.	WHC-SP-0866
I.3.4.2e.	Preplanning obtains such necessary support items as special tools, other equipment, repair parts, and materials required to accomplish the work when needed.	WHC-SP-0866
I.3.4.2f.1.	The planning process normally includes such items as the following: Definition of the problem and identification of the work scope;	WHC-SP-0866
I.3.4.2f.2.	The planning process normally includes such items as the following: Identification and review of necessary procedures, drawings, vendor manuals, and maintenance history;	WHC-SP-0866
I.3.4.2f.3.	The planning process normally includes such items as the following: Identification of needed and available data for use in analysis of maintenance problems;	WHC-SP-0866
I.3.4.2f.4.	The planning process normally includes such items as the following: Procurement of necessary repair parts, materials, tools, and equipment;	WHC-SP-0866
I.3.4.2f.5.	The planning process normally includes such items as the following: Assessment of manpower and skill requirements;	WHC-SP-0866
I.3.4.2f.6.	The planning process normally includes such items as the following: Identification and review of resources, including other tasks scheduled to occur in the immediate area during the same time period;	WHC-SP-0866
I.3.4.2f.7.	The planning process normally includes such items as the following: Identification of initial facility conditions and prerequisites required for work to be accomplished;	WHC-SP-0866
I.3.4.2f.8.	The planning process normally includes such items as the following: Identification of quality control and technical inspection requirements;	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.4.2f.9.	The planning process normally includes such items as the following: Establishment of equipment restoration and postmaintenance inspection or testing requirements;	WHC-SP-0866
1.3.4.2f.10.	The planning process normally includes such items as the following: Review of work instructions of work packages for completion;	WHC-SP-0866
1.3.4.2f.11.	The planning process normally includes such items as the following: Identification of applicable maintenance and operation procedures.	WHC-SP-0866
1.3.4.2g.	Pre- and post-job briefings are performed, as appropriate, to brief personnel on work to be performed and identify lessons learned.	WHC-SP-0866
1.3.4.2h.	Advance planning is performed and routinely updated for scheduled and unscheduled outages. Considerations such as work priority, work procedures and instructions, facility/system conditions, length of outage required, staging of documents and material, and coordination of support activities are included.	WHC-SP-0866
1.3.4.2i.	Management of outages and planning for outages is performed to minimize the duration of these conditions and to use the available time effectively.	WHC-SP-0866
1.3.4.2j.	Preoutage milestones are established, and timely corrective actions are taken when milestones are not being met.	WHC-SP-0866
1.3.4.2k.	Outage planning includes the identification of necessary manpower to support the outage and consideration of contingencies that may occur.	WHC-SP-0866
1.3.4.2l.	Elements of outage work are defined into manageable segments that can be accomplished by a typical work unit on a definite schedule and are entered into a tracking system to allow completion status to be monitored.	WHC-SP-0866
1.3.4.3a.	Planners are trained in the use or application of work performance (time) standards.	WHC-SP-0866
1.3.4.3b.	Work performance (time) standards are used, where possible, as one basis for job-cost estimates.	WHC-SP-0866
1.3.4.3c.	Work performance (time) standards are used as time estimates to ensure that schedules for each job in the daily and weekly schedules are accurate. The standards are reviewed and periodically updated based on actual times taken to perform the work.	WHC-SP-0866
1.3.4.3d.	Job-slotting techniques or other industry-recognized simplified methods are used for applying time standards.	WHC-SP-0866
1.3.4.3e.	Travel or delay times utilized for planning are derived from records or work sampling, where possible, or developed by the planner for the specific circumstances.	WHC-SP-0866
1.3.4.3f.	Productivity measurements are obtained from the use of work performance (time) standards and reported as performance indicators.	WHC-SP-0866
1.3.4.3g.	Work utilization measurements are obtained through the work-sampling process, reported as a performance indicator, and employed in conjunction with the maintenance backlog indicator to manage staffing levels with respect to the work backlog.	WHC-SP-0866
1.3.4.4a.(1)	The following items are considered when assigning priorities: Personnel safety;	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.4.4a.(2)	The following items are considered when assigning priorities: Equipment repair urgency/limiting conditions of operations;	WHC-SP-0866
1.3.4.4a.(3)	The following items are considered when assigning priorities: Operability of redundant equipment;	WHC-SP-0866
1.3.4.4a.(4)	The following items are considered when assigning priorities: Critical path equipment;	WHC-SP-0866
1.3.4.4a.(5)	The following items are considered when assigning priorities: Facility conditions required for equipment repair;	WHC-SP-0866
1.3.4.4a.(6)	The following items are considered when assigning priorities: Repair or replacement parts status;	WHC-SP-0866
1.3.4.4a.(7)	The following items are considered when assigning priorities: Manpower availability.	WHC-SP-0866
1.3.4.4b.	Preventive maintenance and surveillance priorities are established commensurate with personnel and facility safety, environmental protection, programmatic consideration, and value.	WHC-SP-0866
1.3.4.4c.	Corrective maintenance priorities are established based on facility objectives and the relative importance of the equipment.	WHC-SP-0866
1.3.4.5a.	Compliance requirements for a given procedure are clearly stated in the procedure or in other overall guidance and thoroughly communicated to each craftsman.	WHC-SP-0866
1.3.4.5a.(1)	The normal two levels of compliance are: Step-by-step compliance without deviation; or	WHC-SP-0866
1.3.4.5a.(2)	The normal two levels of compliance are: General intent compliance.	WHC-SP-0866
1.3.4.5b.	Preparation, review, approval, and revision of procedures and other work-related documents are properly controlled.	WHC-SP-0866
1.3.4.5c.	Documents used in lieu of procedures (such as excerpts from vendor manuals) receive the same level of review and approval as required for procedures.	WHC-SP-0866
1.3.4.5d.	Procedures and other work-related documents (such as vendor manuals, drawings, reference materials, and posted job performance aids) are used in support of maintenance and are technically accurate and up to date.	WHC-SP-0866
1.3.4.5e.	Procedures are readily available and clearly identified.	WHC-SP-0866
1.3.4.5f.	Maintenance procedures are established and utilized as necessary for the conduct of maintenance activities commensurate with the activity's importance to safety and security.	WHC-SP-0866
1.3.4.5g.(1)	New and revised procedures are reviewed or verified for technical accuracy prior to use and checked or validated to ensure usability and correctness prior to or during initial use.	WHC-SP-0866
1.3.4.5g.(2)	Validation is done in a shop or training environment on a mockup or simulator or by the craftsman and supervisor during the first use of the procedure.	WHC-SP-0866
1.3.4.5h.	Procedures are clear, concise, and contain adequate information for users to understand and perform their activities effectively.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.4.5h.(1)	Items to be considered are: Portions or steps of other documents that are used or referred to when performing a procedure are specifically identified in the procedure.	WHC-SP-0866
1.3.4.5h.(2)	Items to be considered are: Technical details such as setpoints, control logic, and equipment numbers are consistent among procedures, drawings, and system descriptions.	WHC-SP-0866
1.3.4.5h.(3)	Items to be considered are: Human factors considerations are incorporated into procedures to promote error-free performance.	WHC-SP-0866
1.3.4.5i.	Cautions, warnings, and hold points (such as quality checks) are included in the procedures, as needed.	WHC-SP-0866
1.3.4.5j.(1)	The guidance includes the following: Procedures with purpose and scope;	WHC-SP-0866
1.3.4.5j.(2)	The guidance includes the following: Consistent formats for organization, instruction step format, caution and note format, and page format;	WHC-SP-0866
1.3.4.5j.(3)	The guidance includes the following: Methods to generate clearly understood text and assure consistent use of illustrations;	WHC-SP-0866
1.3.4.5j.(4)	The guidance includes the following: Actions to be taken when procedures conflict, are inadequate for the intended tasks, or when unexpected results occur;	WHC-SP-0866
1.3.4.5j.(5)	The guidance includes the following: Allowances for identification and verification of steps that can be performed out of the written sequence; and	WHC-SP-0866
1.3.4.5j.(6)	The guidance includes the following: Requirements for use of procedures in hazardous situations, such as in friable asbestos locations.	WHC-SP-0866
1.3.4.5k.	Temporary changes to procedures, if used, are controlled through appropriate review and authorization prior to use and ensure user awareness of applicable temporary changes.	WHC-SP-0866
1.3.4.5l.	Formal program exists to review procedures periodically for technical accuracy, human-factors considerations, and the inclusion of in-house and industry operating experience.	WHC-SP-0866
1.3.4.5m.	A feedback mechanism is provided for the maintenance personnel to change and/or improve the usability of the procedures(s).	WHC-SP-0866
1.3.4.5n.	The maintenance procedures provide systematic guidance to craftsmen; are technically correct, complete, and up to date; and are presented utilizing sound human factors principles.	WHC-SP-0866
1.3.4.5o.	The maintenance procedures program documents how procedures are to be prepared, verified, validated, reviewed, approved, controlled, updated, revised, and used and specifies where these procedures are to be located.	WHC-SP-0866
1.3.4.6a.	Maintenance activities are scheduled and coordinated for the purpose of avoiding unnecessary removal of equipment and systems from service and providing better manpower utilization.	WHC-SP-0866
1.3.4.6b.	The maintenance work-scheduling process incorporates a tracking system for identifying maintenance work requests being performed and post-maintenance testing.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.4.6c.	Scheduling of daily activities is based on accurate planning estimates to improve the use of craftsmen's time on the job.	WHC-SP-0866
1.3.4.6d.	A priority system is utilized to schedule work.	WHC-SP-0866
1.3.4.6e.	Weekly and/or daily job-scheduling meetings are conducted and the resulting work schedules are published.	WHC-SP-0866
1.3.4.6f.	Maintenance activities are scheduled to assure appropriate supervision and support is available.	WHC-SP-0866
1.3.4.6g.	Facility personnel, especially facility managers, are apprised of scheduled maintenance activities that affect them, thus ensuring proper coordination.	WHC-SP-0866
1.3.4.6h.	Scheduling considers only those planned activities with complete work packages and with all materials and equipment for the job.	WHC-SP-0866
1.3.4.6i.	Within the total available work hours, time is allotted for small call-in jobs, urgent jobs, or other unforeseen events.	WHC-SP-0866
1.3.4.6j.	Timely feedback of work progress to schedulers, supervisors, and management is utilized to modify weekly and/or daily schedules, as necessary.	WHC-SP-0866
1.3.4.6k.	Planned and forced outages are scheduled in a manner ensuring that required maintenance is performed within the time limits available and that opportunities for performing other needed maintenance are maximized.	WHC-SP-0866
1.3.4.6l.	An outage schedule provides for the completion of work elements and testing and provides management with a clear, concise, and understandable method of tracking completion of outage milestones. Supporting schedules are developed where necessary.	WHC-SP-0866
1.3.4.6m.	Outage schedules are updated on a timely basis to reflect changing conditions. When necessary, deviations from the outage plan and schedule are communicated to the proper level of management for action.	WHC-SP-0866
1.3.4.7a.	Post-maintenance testing is performed, as appropriate, after corrective and preventive maintenance activities.	WHC-SP-0866
1.3.4.7b.	The rigor of the testing performed is based on the work done and the importance of the component or equipment to safe and reliable facility operation.	WHC-SP-0866
1.3.4.7c.(1)	The post-maintenance testing program is clearly defined and includes the following elements: Test requirements are identified by the appropriate technical authority. Responsibility for determining post-maintenance test requirements are assigned to functional groups such as operations, maintenance, and technical support.	WHC-SP-0866
1.3.4.7c.(2)	The post-maintenance testing program is clearly defined and includes the following elements: The scope of the post-maintenance testing program is determined to help ensure that appropriate levels of testing are applied to facility equipment and that redundant or unnecessary testing is minimized.	WHC-SP-0866
1.3.4.7c.(3)	The post-maintenance testing program is clearly defined and includes the following elements: The status of equipment that has undergone maintenance is tracked to ensure that all testing is completed prior to work closeout.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.4.7c.(4)	The post-maintenance testing program is clearly defined and includes the following elements: Proper post-maintenance tests are conducted, the results documented, and the resulting data verified to have met acceptance criteria and obtained appropriate sign-offs.	WHC-SP-0866
1.3.4.7d.	Equipment that is important to reliable facility operation is tested in accordance with approved procedures.	WHC-SP-0866
1.3.4.7e.	Post-maintenance test results are documented and reviewed to ensure proper system/equipment performance prior to returning the system to service.	WHC-SP-0866
1.3.4.7g.	Maintenance rework is identified and documented. Corrective actions, including periodic reviews for generic implications, are taken to minimize rework.	WHC-SP-0866
1.3.4.7i.	Newly installed or modified systems/equipment are verified to be in good working order by maintenance staff prior to operational acceptance by the facility staff.	WHC-SP-0866
1.3.4.8a.	The maintenance backlog of work is measured in estimated man-hours and the number of work requests. This is used to adjust manning, as required.	WHC-SP-0866
1.3.4.8b.	The maintenance backlog is monitored to ensure that proper priority is given to facility conditions important to safety, environment, and facility mission.	WHC-SP-0866
1.3.4.8c.	Deferred critical facility maintenance work is documented and justified in writing by management.	WHC-SP-0866
1.3.4.8d.	A maintenance work request is considered part of the backlog from the time the work is identified until all actions are complete, including post-maintenance testing and administrative reviews. Control is maintained by identifying and verifying the status of all valid work requests.	WHC-SP-0866
1.3.4.8e.	Backlog is reduced on the basis of prioritization and work significance.	WHC-SP-0866
1.3.4.8f.(1)	An analysis of maintenance backlog is performed and considers items such as the following: Ratio of preventive to total maintenance;	WHC-SP-0866
1.3.4.8f.(2)	An analysis of maintenance backlog is performed and considers items such as the following: Ratio of emergency-to-nonemergency maintenance;	WHC-SP-0866
1.3.4.8f.(3)	An analysis of maintenance backlog is performed and considers items such as the following: Number of man-hours required to reduce backlog to zero.	WHC-SP-0866
1.3.4.8g.	Budget and manpower levels are evaluated against both the planned maintenance and the amount of work in the backlog.	WHC-SP-0866
1.3.4.8h.	The total amount of backlog is documented each fiscal year in the Site Maintenance Plan.	WHC-SP-0866
1.3.4.8i.	Performance measures are established to monitor the overall condition of the facility against the amount of work in the backlog.	WHC-SP-0866
1.3.4.9a.	Equipment repair history is used to support maintenance activities, upgrade maintenance programs, optimize equipment performance, and improve equipment reliability.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.4.9b.	The maintenance history program defines what data are to be collected, how the data are to be recorded, and how the data are to be used.	WHC-SP-0866
1.3.4.9c.	Maintenance history records are maintained for systems, equipment, and components that affect safe and reliable facility operations or could improve productivity and result in cost savings.	WHC-SP-0866
1.3.4.9d.	A cost-effective equipment history program is in place, including only the equipment that warrants special evaluation based on its initial cost, cost to maintain, and impact on facility safety or operations.	WHC-SP-0866
1.3.4.9e.	Maintenance records are closely correlated with the current issue of the facility master equipment list.	WHC-SP-0866
1.3.4.9g.	Maintenance history records are considered in planning for corrective maintenance, modifications, and preventive maintenance, and development of facility life-cycle plans.	WHC-SP-0866
1.3.4.9h.	Maintenance history records are readily available for use by supervisors, work planners, and maintenance or plant engineers.	WHC-SP-0866
1.3.4.9i.	Maintenance history is periodically and systematically reviewed to identify equipment trends and persistent maintenance problems and to assess their impact on facility reliability.	WHC-SP-0866
1.3.4.9j.	Equipment maintenance and repair history files contain items such as the following: equipment and component identification, maintenance records, diagnostic monitoring data, vendor information (or a reference to this information), corrective and preventive maintenance or modification information, and spare parts information.	WHC-SP-0866
1.3.4.9k.	The maintenance record is a chronological list of all maintenance repair work and materials expended on a piece of equipment or component.	WHC-SP-0866
1.3.4.9l.	Equipment repair history data is used for such activities as failure analysis, conduct of maintenance assessments, preventive maintenance, outage planning, budget preparation, reviews of DOE-wide experience, and plant life extension.	WHC-SP-0866
1.3.4.9m.	Vendor information obtained from suppliers is controlled and indexed for ready retrieval.	WHC-SP-0866
1.3.4.9n.	Personnel using vendor manuals are provided with technically adequate documents that can be relied upon to provide best available information.	WHC-SP-0866
1.3.5.1a.	Maintenance facilities, including storage facilities and laydown and staging areas, are sized and arranged to promote the safe and effective completion of work.	WHC-SP-0866
1.3.5.1b.	Maintenance training facilities, shops, satellite work areas, laydown and staging areas, storage facilities, mockups, temporary facilities, shower and toilet facilities, lunch areas, conference areas, and offices are evaluated for adequacy.	WHC-SP-0866
1.3.5.1d.	Work areas are uncluttered and in an orderly condition.	WHC-SP-0866
1.3.5.1e.	Facility equipment is accessible for maintenance activities. Fixed local area hoists, ladders, and work platforms are provided, as needed.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.5.1f.	Storage facilities for parts and materials being gathered for or issued for a job are adequate and provide environmental controls to protect the parts and materials.	WHC-SP-0866
1.3.5.1g.	Tool and equipment storage facilities are located near shops and normal work areas to improve maintenance efficiency.	WHC-SP-0866
1.3.5.1h.	Adequate office equipment is provided for efficient and effective work.	WHC-SP-0866
1.3.5.1i.	Communication equipment is reliable and provides necessary facility coverage.	WHC-SP-0866
1.3.5.1j.	Facility equipment and associated components are properly labeled with sufficient information so that they can be easily identified by personnel.	WHC-SP-0866
1.3.5.1k.	A plan for identifying and using maintenance laydown and staging areas is developed and kept current.	WHC-SP-0866
1.3.5.2a.	An effective procurement process is provided to ensure that parts, materials, and services are available for work activities when they are scheduled.	WHC-SP-0866
1.3.5.2b.	Procurement documents provide clear and adequate technical and quality assurance requirements consistent with design specifications.	WHC-SP-0866
1.3.5.2c.	Topics such as storage, in-storage preventive maintenance, and shelf-life requirements are addressed.	WHC-SP-0866
1.3.5.2d.	Proper engineering control and approval are obtained on any deviation from design specifications for parts or materials.	WHC-SP-0866
1.3.5.2e.	Mechanisms are in place to provide for the expeditious procurement of parts and material on a high priority basis when needed.	WHC-SP-0866
1.3.5.2f.	Methods are established to acquire replacement parts not available through the original supplier.	WHC-SP-0866
1.3.5.2g.	Lessons learned from experience, such as lead times, parts usage, and supplier reliability, are factored into materials management.	WHC-SP-0866
1.3.5.2h.	Material and parts activity are reviewed to determine possible new additions to be included in spare parts or site stores catalog.	WHC-SP-0866
1.3.5.2i.	Off-site services are used when justified by specifications and/or economic reasons.	WHC-SP-0866
1.3.5.2j.	Purchased major electrical systems and equipment include provisions for isolation to permit disconnect for maintainability.	WHC-SP-0866
1.3.5.2k.	Long lead-time maintenance items services, and their procurement sources, are identified in order to expedite their procurement.	WHC-SP-0866
1.3.5.2l.	Deficient or nonconforming items are resolved in an effective and timely manner.	WHC-SP-0866
1.3.5.2m.	Quality assurance records are controlled and maintained to provide documentation for qualified parts and materials and to ensure traceability.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.5.2n.	Material Safety Data Sheets (MSDS) are obtained for hazardous materials and chemicals procured.	WHC-SP-0866
1.3.5.2o.	Identification of the need for specialized services from vendors is made early to provide for timely submittal of, bidding on, and award of contracts.	WHC-SP-0866
1.3.5.2p.	Applicable quality assurance provisions of reference g are followed.	WHC-SP-0866
1.3.5.3a.	Effective material control is practical and is achieved when the right materials in the correct quantities are delivered to the job location at the proper time.	WHC-SP-0866
1.3.5.3b.	Policies and procedures are prepared to specifically describe the responsibilities and techniques for receiving, inspecting, handling, storing, retrieving, and issuing equipment, parts, and materials.	WHC-SP-0866
1.3.5.3c.	Procedures/instructions are available for items requiring special handling.	WHC-SP-0866
1.3.5.3d.	Material is inspected to ensure conformance to purchasing requirements prior to release for use and storage.	WHC-SP-0866
1.3.5.3e.	Documentation for received material can be accounted for and is retrievable.	WHC-SP-0866
1.3.5.3f.	Nonconforming items are identified with tags or labels and controlled to prevent unauthorized use.	WHC-SP-0866
1.3.5.3g.	Effective material procurement status is provided, including accurate stock records and tracking of purchase orders.	WHC-SP-0866
1.3.5.3h.	Materials are stored, protected, and identified in a manner that provides ready availability for its intended use.	WHC-SP-0866
1.3.5.3i.	A shelf-life control program is provided for store items that are important to safe and reliable facility operation.	WHC-SP-0866
1.3.5.3j.	Safety-related and nonsafety-related materials and equipment are segregated from each other to prevent inadvertent use of the wrong category of item.	WHC-SP-0866
1.3.5.3k.	Periodic inspections of staging areas, stores, and warehouses are performed.	WHC-SP-0866
1.3.5.3l.	The quality of stored equipment, parts, and materials is maintained in accordance with vendor information by appropriate means, such as environmental and shelf-life controls and preventive maintenance activities, if necessary.	WHC-SP-0866
1.3.5.3m. [1]	Parts and materials issued for installation are properly controlled.	WHC-SP-0866
1.3.5.3m. [3]	Completed work requests/orders document material traceability.	WHC-SP-0866
1.3.5.3n.	Critical parts are readily traceable from purchase to installation.	WHC-SP-0866
1.3.5.3o.	Flammable and hazardous materials are identified, segregated, and properly controlled during receipt inspection, storage, and issuance.	WHC-SP-0866
1.3.5.3p.	Equipment and materials used by nonfacility personnel (personnel not directly employed by the facility operating contractor) are subject to inspection, storage, and issuance controls equivalent to items received through normal facility processes.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.5.3q.	For items requiring special handling instructions, procedures are prepared that include such items as the weight, size, chemical reactivity, radioactivity and susceptibility to physical shock, damage, or electrostatic sensitivity. This also includes lifting instructions.	WHC-SP-0866
1.3.5.4a.	M&TE includes all devices or systems used to inspect, test, calibrate, measure, or troubleshoot in order to control or acquire data for verifying the conformance of an instrument or piece of equipment to specified requirements.	WHC-SP-0866
1.3.5.4b.	M&TE does not include permanently installed system instrumentation, nor does it include test equipment used for preliminary checks where data obtained will not be used to determine acceptability or verify conformance to established criteria.	WHC-SP-0866
1.3.5.4c.	All M&TE devices have unique identification numbers that accurately identify the specific devices and provide positive traceability.	WHC-SP-0866
1.3.5.4d.	A master list identifying all M&TE is developed and kept current.	WHC-SP-0866
1.3.5.4e.	The M&TE calibration program is based on standards that are traceable to a national standard or that are recognized standards unto themselves.	WHC-SP-0866
1.3.5.4f.	Procedures are used to calibrate M&TE control the performance of calibrations, provide repeatable calibrations, and provide acceptance criteria.	WHC-SP-0866
1.3.5.4g.	A calibration frequency that helps maintain M&TE accuracy and availability is established.	WHC-SP-0866
1.3.5.4i.	Facilities are provided to control storage, issuance, and calibration of M&TE.	WHC-SP-0866
1.3.5.4j.	Any M&TE with suspected or actual deficiencies is segregated and marked to prohibit its use.	WHC-SP-0866
1.3.5.4k.	M&TE devices that are not fully calibrated or usable are clearly marked to indicate their limitations.	WHC-SP-0866
1.3.5.4l.	M&TE documentation includes records for accountability and traceability of use. A recall system is developed for recalibrations.	WHC-SP-0866
1.3.5.4m.	M&TE devices found out of calibration or defective receive timely evaluations to determine the validity of all measurements/tests for which they were used.	WHC-SP-0866
1.3.5.4n.	M&TE reliability problems are trended to determine any corrective actions needed.	WHC-SP-0866
1.3.5.4o.	Periodic reviews are conducted to determine that the control of M&TE is effective.	WHC-SP-0866
1.3.5.4q.	Results of M&TE calibrations are trended, and corrective actions are determined for any M&TE reliability problems.	WHC-SP-0866
1.3.5.5a.	Proper tools, equipment, and consumable supplies are available to support work requirements.	WHC-SP-0866
1.3.5.5b.	The process of providing tools and equipment for the facility includes proper storage and issue controls.	WHC-SP-0866
1.3.5.5d.	Proper loading, lifting, and transporting equipment are available for movement of large equipment.	WHC-SP-0866
1.3.5.5e.	Maintenance tools and other support equipment are included in the preventive maintenance program.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.5.5f.	Special tools, test rigs, special equipment, lifting and rigging equipment, and mockups are suitable for their intended use and properly identified.	WHC-SP-0866
1.3.5.5g.	Specific instructions are provided to control the use of lifting and rigging equipment.	WHC-SP-0866
1.3.5.5h.	Scaffolding and rigging equipment are identified, tested, and properly stored.	WHC-SP-0866
1.3.5.5i.	Equipment and tools are maintained in a high state of readiness.	WHC-SP-0866
1.3.5.5j.	Fixed local area hoists and work platforms are provided, as needed, to facilitate maintenance access to facility equipment.	WHC-SP-0866
1.3.5.5k.	The process of providing and developing tools and equipment for the facility include consideration of safety, availability for future use, cost-effectiveness, control, and storage.	WHC-SP-0866
1.3.5.5l.	Worn, defective, or otherwise unusable tools are identified, segregated, and disposed of so that only safe, usable tools are available for use.	WHC-SP-0866
1.3.6.1a.	A master list of equipment to be included in the PM program is developed and analyzed for cost-effectiveness.	WHC-SP-0866
1.3.6.1b.	An effective preventive maintenance program is implemented and includes systems and equipment that affect safe and reliable facility operation.	WHC-SP-0866
1.3.6.1c.	Preventive maintenance is performed at predetermined and scheduled intervals and seeks to maximize equipment availability.	WHC-SP-0866
1.3.6.1d.	Considerations such as operational experience, vendor recommendations, engineering analysis, cost/benefit analysis, and especially reliability considerations are used as a basis to establish preventive maintenance tasks and intervals.	WHC-SP-0866
1.3.6.1e.(1)	Preventive maintenance activities are scheduled and performed within established intervals and, when possible, combined with corrective maintenance activities on the same equipment.	WHC-SP-0866
1.3.6.1e.(2)	Preventive maintenance is waived or deferred only with management approval.	WHC-SP-0866
1.3.6.1f.	Preventive maintenance documentation provides a record of activities performed, data collected, and, where appropriate, the "as-found" and "as-left" condition of the equipment.	WHC-SP-0866
1.3.6.1g.	Preventive maintenance is utilized to assess equipment performance, make adjustments, and perform other corrective actions where needed.	WHC-SP-0866
1.3.6.1h.	Preventive maintenance work procedures are utilized for facility equipment requiring special permits, special plant conditions or line up, and/or special tools, parts, or lubricants.	WHC-SP-0866
1.3.6.1i.	As part of the maintenance surveillance program, functional tests of installed equipment and/or systems (such as standby equipment or nonoperating equipment scheduled for rotation) are conducted and documented.	WHC-SP-0866
1.3.6.1j.	Trending data is acquired as part of the maintenance surveillance program for long-term performance evaluations, such as bearing temperatures, pump speed, and vibration data.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.6.1k.	Administrative systems and controls provide for timely completion and review of required surveillances.	WHC-SP-0866
1.3.6.1l.	Maintenance surveillance testing programs result in a high degree of reliability in the equipment needed for safe facility operation.	WHC-SP-0866
1.3.6.1m.	The effectiveness of the surveillance program is periodically evaluated at an appropriate level of management and the results used to make program improvements.	WHC-SP-0866
1.3.6.1n.	Abnormalities found during surveillances or preventive maintenance are immediately reported to higher authority.	WHC-SP-0866
1.3.6.1o.	The basis for the planned preventive maintenance program is documented. Any deferral of preventive maintenance tasks has a technical basis.	WHC-SP-0866
1.3.6.2a.	Predictive maintenance techniques, such as reliability-centered maintenance (RCM) programs, are used to identify the need for preventive maintenance prior to equipment failure so that the predictive maintenance program is effective in reducing the failure of structures, systems, and components.	WHC-SP-0866
1.3.6.2b.	The data gathered from tests, diagnostic equipment, fluid analysis, and other similar methods are analyzed, trends identified, and action plans/corrective actions defined.	WHC-SP-0866
1.3.6.2c.	In-process monitoring of equipment is controlled by establishing the proper conditions, systems configuration, and operating parameters to help ensure that the data collected are comparable and trendable.	WHC-SP-0866
1.3.6.2d.	Equipment monitoring locations are identified and marked to obtain consistent readings each time predictive maintenance data are recorded.	WHC-SP-0866
1.3.6.2e.	Mechanisms are established to provide feedback to the facility maintenance program in time to preclude equipment failure.	WHC-SP-0866
1.3.6.2f.	The predictive maintenance program provides data to the preventive maintenance program and provides for retrieval of equipment history data.	WHC-SP-0866
1.3.6.2g.	For all system/component/part failures, the root cause is determined, if possible, and the preventive maintenance program modified, as required, by feed-back of actions taken or results.	WHC-SP-0866
1.3.6.2h.	Because all equipment conditions and failure modes cannot be monitored, predictive maintenance is selectively applied where experience indicates that it is most cost effective or best enhances safety.	WHC-SP-0866
1.3.6.3a.	A detailed master list of equipment, components, and structures to be included in the maintenance program is developed.	WHC-SP-0866
1.3.6.3b.	Maintenance personnel are attentive to identifying and correcting facility deficiencies with a goal of maintaining equipment/systems in optimum operating condition.	WHC-SP-0866
1.3.6.3c.	Corrective maintenance activities are controlled to ensure equipment and/or systems are returned to normal operating configuration.	WHC-SP-0866
1.3.6.3d.(1)	Good maintenance work practices are followed, including: Proper tools and equipment are used;	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.6.3d.(2)	Good maintenance work practices are followed, including: Good safety practices are followed;	WHC-SP-0866
1.3.6.3d.(3)	Good maintenance work practices are followed, including: Foreign materials and contaminants are excluded from open systems and equipment;	WHC-SP-0866
1.3.6.3d.(4)	Good maintenance work practices are followed, including: Prejob briefings; training; job procedure use; quality workmanship, materials, and parts; and proper postjob reporting are utilized;	WHC-SP-0866
1.3.6.3d.(5)	Good maintenance work practices are followed, including: Work sites are clean and orderly.	WHC-SP-0866
1.3.6.4a.	Temporary modifications, defined as temporary repairs to the facility allowing equipment to remain in or be returned to service in a condition that is not the same as the original design specification, receive appropriate reviews prior to implementation to ensure the adequacy of the repair and to assess its effect on personnel and equipment safety and reliability.	WHC-SP-0866
1.3.6.4b.	Temporary modifications are tracked after their completion for consideration of permanent repairs. Permanent corrective action is taken as soon as practicable.	WHC-SP-0866
1.3.6.4c.	Prior to implementation, a review is performed to look at facility modifications to determine future required maintenance activities and to specify that these activities be added to the maintenance surveillance, preventive, and predictive programs, as applicable.	WHC-SP-0866
1.3.6.4d.	Changes to facility processes, alarm setpoints, and computer software required by facility modifications are controlled.	WHC-SP-0866
1.3.6.4e.	The modifications packages identify changes to the spare parts system, dispositions of parts/material reused, etc.	WHC-SP-0866
1.3.6.4f.	Documents affected by plant modifications, such as drawings and procedures commonly used for system operation, tagouts, and maintenance, are updated prior to operation of the system or equipment.	WHC-SP-0866
1.3.6.4g.	On-site modifications, rework, and repairs performed by vendors or construction forces are controlled in a similar manner as other work activities.	WHC-SP-0866
1.3.7.1a.	Recurring maintenance problems are reduced by identifying and resolving the root causes of the problems.	WHC-SP-0866
1.3.7.1b.(1)	An analysis program is established to investigate unplanned occurrences that have an impact on safety or reliability or are of a recurring nature.	WHC-SP-0866
1.3.7.1b.(2)	This program includes the methodical collection of facts describing the unplanned occurrence.	WHC-SP-0866
1.3.7.1b.(3)	Outside experts are utilized when required.	WHC-SP-0866
1.3.7.1c.(1)	An acceptable root causes will meet the following criteria: Its correction prevents recurrence of the unplanned occurrence;	WHC-SP-0866
1.3.7.1c.(2)	An acceptable root cause will meet the following criteria: Its correction is feasible;	WHC-SP-0866
1.3.7.1c.(3)	An acceptable root cause will meet the following criteria: Its correction does not adversely impact safety, reliability, or operational goals.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.7.1d.	Root causes are categorized in terms of either human performance or equipment performance.	WHC-SP-0866
1.3.7.1e.	When all root causes involved have been determined, a corrective action plan is developed, executed, and tracked to completion.	WHC-SP-0866
1.3.7.1f.	The analysis program addresses any generic corrective actions that need to be taken after problems with the specific piece of equipment have been determined and corrected.	WHC-SP-0866
1.3.7.1g.	After analysis is performed to determine the root causes(s) of failure, corrective action is taken that includes feedback into the preventive and predictive maintenance programs and maintenance training and qualification programs.	WHC-SP-0866
1.3.7.2a.	A periodic assessment of equipment, systems, and facilities is conducted to adjust preventive maintenance actions and tools and equipment availability and to determine inadequacies.	WHC-SP-0866
1.3.7.2b.	Reviews of the overall effectiveness and efficiency of the procurement and material control process are conducted.	WHC-SP-0866
1.3.7.2c.	Measuring and test equipment is periodically reviewed to verify that it is supporting the safe and reliable operation of the facility.	WHC-SP-0866
1.3.7.2d.	The maintenance training program is periodically reviewed to identify training program enhancements or changes in emphasis.	WHC-SP-0866
1.3.7.2e.	The work control system is periodically reviewed to ensure that documentation is consistent with the work accomplished and that all necessary work is being accomplished.	WHC-SP-0866
1.3.7.2f.	Review of a consistent broad range of performance indicators is performed periodically.	WHC-SP-0866
1.3.7.2g.(1)	The results of this review and analysis are used as the basis for program improvements such as the following: Adjustments to preventive maintenance frequencies;	WHC-SP-0866
1.3.7.2g.(2)	The results of this review and analysis are used as the basis for program improvements such as the following: Addition or deletion of preventive maintenance activities;	WHC-SP-0866
1.3.7.2g.(3)	The results of this review and analysis are used as the basis for program improvements such as the following: Proposed design changes;	WHC-SP-0866
1.3.7.2g.(4)	The results of this review and analysis are used as the basis for program improvements such as the following: Adjustments to spare parts and materials stock levels;	WHC-SP-0866
1.3.7.2g.(5)	The results of this review and analysis are used as the basis for program improvements such as the following: Adjustments to manpower and/or training; and	WHC-SP-0866
1.3.7.2g.(6)	The results of this review and analysis are used as the basis for program improvements such as the following: Adjustments in tools, equipment, and facilities or modifications to improve facility equipment maintainability.	WHC-SP-0866
1.3.7.2h.	The backlog management program is periodically reviewed to verify that actions are effective in maintaining or reducing the backlog to comply with the Backlog Work Control criteria of Section 3.4.8.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.7.3a.	Each maintenance organization develops a method of measuring maintenance system performance (such as the maintenance and repair costs of buildings measured in dollars per square foot, the growth of backlog of maintenance and repair, the amount of unscheduled maintenance and repair costs, the amount of emergency maintenance costs, or other similar items).	WHC-SP-0866
1.3.7.3b.	Programs are routinely implemented to monitor, collect, trend, and analyze performance data (including thermal, hydraulic, electrical, acoustical, and mechanical data) for equipment, systems, and components important to facility reliability and efficiency.	WHC-SP-0866
1.3.7.3c.	Performance data is analyzed and the results used to determine the reliability of key facility systems and components and to identify ways to optimize facility reliability and efficiency.	WHC-SP-0866
1.3.7.3e.	Performance indicators enable a maintenance manager to quantitatively track progress toward defined goals.	WHC-SP-0866
1.3.7.4a.[1]	Maintenance managers are involved and know what is going on by frequently touring the facility.	WHC-SP-0866
1.3.7.4a.[2]	Effective corrective actions are taken for noted problems.	WHC-SP-0866
1.3.7.4a.[3]	The maintenance program is periodically reviewed by facility management in self-assessments.	WHC-SP-0866
1.3.7.4b.	Maintenance performance is checked by observing people at work and also by inspecting, monitoring, and checking equipment and by timely followup of corrective actions.	WHC-SP-0866
1.3.7.4c.	Maintenance managers include time in their routine schedules for walking through the facility.	WHC-SP-0866
1.3.7.4d.[1]	Facility tours and personnel contacts are also performed during "off-shifts" and cover selected facility areas and personnel activities.	WHC-SP-0866
1.3.7.4d.[2]	The results and observations of these tours are documented and corrective action plans created where appropriate.	WHC-SP-0866
1.3.7.4e.	Senior managers monitor the assessment activities of their subordinate managers and supervisors.	WHC-SP-0866
1.3.7.4f.[1]	Management and supervisory assessment and improvement efforts are performance oriented.	WHC-SP-0866
1.3.7.4f.[2]	Line managers and supervisors are responsible for determining and implementing corrective actions.	WHC-SP-0866
1.3.7.4g.	Selected operational data reflecting facility performance are analyzed and trended, and the results are forwarded to appropriate levels of management.	WHC-SP-0866
1.3.7.4h.[1]	Root causes are determined for problems identified during monitoring of facility activities and by analysis of trends.	WHC-SP-0866
1.3.7.4h.[2]	Corrective actions are initiated and tracked to completion.	WHC-SP-0866
1.3.7.4i.	Management assessments are conducted to determine the reasons for success or failure in achieving objectives. Results are incorporated into future objectives.	WHC-SP-0866
1.3.7.4j.	Maintenance management establishes the percentage of time that first line supervisors are expected to spend supervising field work.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
1.3.7.4k.	A key element of management involvement is the establishment of a feedback system to identify problem areas and create participation in improvements.	WHC-SP-0866
1.3.7.5a.	When performing work sampling, the craft or shop group is utilized as the unit of measure, not the individual craftsman.	WHC-SP-0866
1.3.7.5b.	When performing work sampling, the categories of time affecting the total job (such as travel, job preparation, direct work, and delay time or idle status associated with the work activities) are determined and utilized.	WHC-SP-0866
1.3.7.5c.	Work sampling provides a base case or basis against which all subsequent improvements can be measured.	WHC-SP-0866
1.3.7.5d.	Work sampling is utilized to measure the effects of planned improvements to craft utilization.	WHC-SP-0866
1.3.7.5e.	Maintenance performance is checked by observing people at work.	WHC-SP-0866
1.3.7.6a.	Accounting for maintenance is established to allow management to understand clearly the scope of planned maintenance efforts for the funding allotted.	WHC-SP-0866
1.3.7.6b.	Procedures are in place to define proper cost coding and cost verification.	WHC-SP-0866
1.3.7.6c.	Managers and supervisors review cost data to prevent overruns and to detect adverse trends.	WHC-SP-0866
1.3.7.6d.	Estimated job costs from the planning effort are evaluated against final job costs.	WHC-SP-0866
1.3.7.6e.	Budgets are justified by factual or historical maintenance costs or by some other industry-recognized method that provides information on the resources required to maintain the capital asset in a state of good repair.	WHC-SP-0866
1.3.7.7a.	Inspections, audits, reviews, investigations, and self-assessments are utilized to provide feedback to the maintenance program.	WHC-SP-0866
1.3.7.7b.	The ability to apply lessons learned from in-house maintenance experiences (and the experiences of others) is considered an essential aspect for long-term success.	WHC-SP-0866
1.3.7.7c.	Related maintenance experience at other facilities or DOE sites is evaluated and appropriate changes made to systems procedures, and management concepts.	WHC-SP-0866
1.3.7.7d.	Procedures are in place to assign responsibility for areas needing improvement corrective action and followup. Corrective actions are tracked and reported until completion.	WHC-SP-0866
1.3.7.7e.	Quality assurance/quality control, safety, and environmental audits and inspections are promptly evaluated and appropriate action taken.	WHC-SP-0866
1.3.7.7f.	Changes or modifications resulting from audits and lessons learned are documented in policies and procedures.	WHC-SP-0866
II. 2.3.1[1]	It is a primary responsibility of the maintenance manager to ensure implementation of contractor management and facility policies that affect the maintenance organization.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
11.2.3.3[1.1]	The maintenance manager is responsible for helping to select high-quality personnel, for effective use of available resources, for assessment of resource adequacy, and for making recommendations regarding needed changes to the appropriate manager.	WHC-SP-0866
11.3.2[1.2]	These training programs are supported and guided by the maintenance organization.	WHC-SP-0866
11.3.2[1.3.1]	This support and guidance normally includes all or a portion of the following tasks: Defining the jobs, tasks, skill levels, and responsibilities of individuals in these positions;	WHC-SP-0866
11.3.2[1.3.2]	This support and guidance normally includes all or a portion of the following tasks: Defining training programs for each position;	WHC-SP-0866
11.3.2[1.3.3]	This support and guidance normally includes all or a portion of the following tasks: Determining the content and emphasis of the training needed;	WHC-SP-0866
11.3.2[1.3.4]	This support and guidance normally includes all or a portion of the following tasks: Determining and supporting training schedules;	WHC-SP-0866
11.3.2[1.3.5]	This support and guidance normally includes all or a portion of the following tasks: Determining the training needs of and tailoring the training program for each individual based on his previous education, training, experience, and skill level;	WHC-SP-0866
11.3.2[1.3.6]	This support and guidance normally includes all or a portion of the following tasks: Providing instructors and trainers;	WHC-SP-0866
11.3.2[1.3.7]	This support and guidance normally includes all or a portion of the following tasks: Establishing qualification criteria, with emphasis on successful performance in the field;	WHC-SP-0866
11.3.2[1.3.8]	This support and guidance normally includes all or a portion of the following tasks: Coordinating the conduct of and instruction during OJT;	WHC-SP-0866
11.3.2[1.3.9]	This support and guidance normally includes all or a portion of the following tasks: Qualifying individuals as they complete their training programs;	WHC-SP-0866
11.3.2[1.3.10]	This support and guidance normally includes all or a portion of the following tasks: Providing training-effectiveness feedback to the training organization to enhance and, where necessary, adjust course teaching methods, content and emphasis.	WHC-SP-0866
11.3.3.2[1.3]	Detailed guidance in accomplishing this is available in established industrial guidelines.	WHC-SP-0866
11.3.3.3[1.2.2]	One method to accomplish this is to require potential employees to pass a written test as part of the interview process. Based on the test results, the training program and milestones for that individual are established.	WHC-SP-0866
11.3.3.4[2.2]	Personnel with maintenance experience in the training department, as well as personnel in the maintenance department itself, may be used as OJT trainers.	WHC-SP-0866
11.4.3.1a.[3]	Supervisors need to be responsive to maintaining work place environmental controls conducive to increased maintenance quality and work efficiency.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
11.4.3.1d.(1.1)	Temporary facilities are required for activities involving airborne radioactivity and contamination control and contractor support during outages.	WHC-SP-0866
11.5.1(2.1)	This section provides guidelines in establishing the proper relations of the types of maintenance in the maintenance program.	WHC-SP-0866
11.5.2(1.2)	On important systems and equipment, a thorough technical analysis using methods such as reliability-centered maintenance (RCM) may be needed to establish this balance.	WHC-SP-0866
11.5.2(1.3)	On less important systems, the amount of preventive maintenance to be performed may be determined using a more basic judgmental engineering analysis.	WHC-SP-0866
11.5.2(5.2.1)	A method that determines how each of the different types of maintenance is to be used to maintain each system and piece of equipment.	WHC-SP-0866
11.5.3.2c.(2.3)	Knowledgeable individuals must review and analyze these data for the predictive maintenance program to be successfully used to predict and address incipient failures.	WHC-SP-0866
11.5.3.3(3.1)	In establishing a balance between corrective and preventive maintenance as they pertain to the various facility systems and equipment, the overriding consideration must be safe and reliable facility operations achieved on a cost-effective basis.	WHC-SP-0866
11.6.2(1.2)	This guidance must be technically accurate, complete, up to date, and presented in a clear, concise, and consistent manner that minimizes human error.	WHC-SP-0866
11.6.2(2.2)	Other factors, such as control of reference material, procedure identification and storage, and the requirement to maintain accurate procedures, must also be considered.	WHC-SP-0866
11.6.3.1(2.2)	Experienced craftsmen and engineers can be trained to write maintenance procedures or procedure writers can be used with craftsmen or engineers providing technical input.	WHC-SP-0866
11.6.3.2(1.3)	This may be accomplished by comparing the vendor manual and design specifications to the procedures.	WHC-SP-0866
11.6.3.3	Validation may be conducted in a shop, in a training environment, on a mockup or simulator, or in some cases by the craftsman and his supervisor during the first use of the procedure.	WHC-SP-0866
11.6.3.5(2.2)	Compliance requirements may vary considerably, depending on the proficiency of the craftsman and the potential impact of the maintenance being performed on station safety, reliability, and continuity of operations.	WHC-SP-0866
11.6.3.5(2.4.1)	Normally, two levels of compliance are defined: Step-by-step compliance without deviation (such compliance is normally expected for maintenance on safety-related equipment, for equipment important to facility reliability, and for any activity that could result in a transient or facility shutdown).	WHC-SP-0866
11.6.3.5(2.4.2)	Normally, two levels of compliance are defined: General intent compliance (the experienced judgment of the craftsman or his supervisor is exercised to carry out the maintenance).	WHC-SP-0866
11.6.3.5(3.1)	Other compliance categories and definitions may be used, such as identifying a group of steps that may be performed out of sequence.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
11.6.3.5[5.3]	Procedures may need to be changed or revised as described in Section 6.3.6 before restarting.	WHC-SP-0866
11.6.3.6[6.3]	When vendor recommendations conflict with maintenance experience, a documented engineering evaluation may be required.	WHC-SP-0866
11.7.3.1a.[1.1]	Planning maintenance activities can be accomplished by a dedicated planning staff or by maintenance supervisors at facilities with smaller staffs.	WHC-SP-0866
11.7.3.1a.[1.2]	If a dedicated group is used, it may be established as a central planning group or decentralized with planners for each discipline working within their respective groups.	WHC-SP-0866
11.7.3.2a.[1.4.1]	Features of the system that could be helpful in managing the work backlog include the following: A computerized system with the ability to sort work requests by priority work request date, facility conditions required, and systems affected;	WHC-SP-0866
11.7.3.2a.[1.4.2]	Features of the system that could be helpful in managing the work backlog include the following: A status of all work requests on hold for planning, parts, material, or other constraints;	WHC-SP-0866
11.7.3.2a.[1.4.3]	Features of the system that could be helpful in managing the work backlog include the following: A tracking system to maintain the status of all work requests currently being worked;	WHC-SP-0866
11.7.3.2a.[1.4.4]	Features of the system that could be helpful in managing the work backlog include the following: A tracking system to ensure that all required post-maintenance testing is accomplished prior to the return of a piece of equipment or a system to service (especially important following outages where many jobs may be performed on a system that is removed from service for an extended period or where several jobs are done under one clearance).	WHC-SP-0866
11.7.3.2a.[3.3]	These principles also apply on an interdisciplinary basis.	WHC-SP-0866
11.7.3.2a.[4.2]	It may be done independently of or within the work control scheduling system.	WHC-SP-0866
11.7.3.2a.[4.3]	Regardless of the method used, it is essential that all affected groups have adequate advance notification of each preventive maintenance action to be accomplished.	WHC-SP-0866
11.7.3.3[1.2]	Meetings involving routine job scheduling need to be held frequently to properly communicate priorities, current problems, job interferences, and requests for support among facility organizations.	WHC-SP-0866
11.7.3.3[2.2]	This may be done by publishing and updating a short-duration, rolling schedule covering approximately 3 days.	WHC-SP-0866
11.7.3.4a.[1.2]	Planning and scheduling for major maintenance activities and modifications may have to be planned several years in advance depending on the complexity of the effort.	WHC-SP-0866
11.7.3.4b.[2.5]	A computerized work request system can provide significant assistance in accomplishing the above tasks.	WHC-SP-0866
11.8.2[2.2]	The work control system also provides a means of collecting facility maintenance data to be used for failure analysis (See Section 17) and maintenance history.	WHC-SP-0866
11.8.2[4]	Configuration control is maintained by ensuring that systems and equipment are restored to their original condition following maintenance.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
11.8.3.1[1.2]	Administrative requirements may be contained in separate documents covering individual areas or in one overall procedure that describes the administrative control of maintenance activities.	WHC-SP-0866
11.8.3.1[3]	The work control procedure may cross-reference to or include outage scheduling and control procedures.	WHC-SP-0866
11.8.3.2[2.2]	This review can be simple or extensive, depending on various factors, such as the complexity of the job and its relation to facility safety and reliability.	WHC-SP-0866
11.8.3.6[1.5]	Experienced personnel could be allowed to bypass training by proving proficiency through examination and demonstration.	WHC-SP-0866
11.9.2[1.3]	In some cases, this may include testing of additional equipment to verify system performance.	WHC-SP-0866
11.9.3.1[1.2]	This program may be a part of the facility work control system and may use the facility work request or work package to specify testing, assign responsibility, and document acceptance of all post-maintenance tests.	WHC-SP-0866
11.9.3.1[1.4]	This may be accomplished by recording the data directly on the work request or by referencing data recorded on post-maintenance test data sheets or documents.	WHC-SP-0866
11.9.3.1[1.8]	Technical support organization assistance is also normally required on tasks that are complex and require engineering assistance, even though no code and technical specification requirements apply.	WHC-SP-0866
11.9.3.2[3.1]	Various classifications of equipment will require different levels of procedure support for post-maintenance testing.	WHC-SP-0866
11.9.3.2[3.3]	An engineering or system acceptance test procedure, alignment check procedure, generic test procedure, or special test procedure may also be used to provide test instructions.	WHC-SP-0866
11.9.3.2[4.1]	For "troubleshooting" work requests, it may not be feasible to determine fully the post-maintenance test requirements until the troubleshooting is complete.	WHC-SP-0866
11.9.3.3[2.2]	Danger or caution tags may be required for the equipment until proper post-maintenance testing can be completed.	WHC-SP-0866
11.9.3.4[1.3]	Maintenance, technical support, quality control, and other personnel may also be involved in or called upon to perform post-maintenance testing.	WHC-SP-0866
11.9.3.4[1.5]	Minor equipment post-maintenance testing may be performed by the operator returning the equipment to service, the craftsman performing the maintenance, the engineer following the maintenance, or a combination of these and other needed individuals.	WHC-SP-0866
11.10.3.1[1.2]	These policies must be understood by stores and purchasing personnel and other personnel who interface with the stores and purchasing operation, such as maintenance supervisors, planning, and scheduling personnel.	WHC-SP-0866
11.11.2[1.3]	These policies must be understood by stores personnel and other organizations that interfere with the stores operation, such as purchasing, quality assurance, quality control, engineering, radiological protection, operations, safety, and maintenance.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
11.11.3.1[1.2]	In the case of safety-related items and designated critical items that are important to reliable facility operations, physically inspect the items to ensure that the vendor has supplied what was ordered, that the necessary formal documentation has accompanied the shipment or is otherwise on hand, and that items have been received in an acceptable condition.	WHC-SP-0866
11.11.3.1[1.3]	Technical staff and maintenance personnel may be needed to assist in the inspection of more complicated parts, materials, and equipment.	WHC-SP-0866
11.11.3.1[2.3]	An acceptance tag or label placed on the received material may be used to signify that the receiving inspection was satisfactory and that the applicable requirements have been met.	WHC-SP-0866
11.11.3.1[4.1]	Nonconforming material must also be clearly tagged or labeled to prevent inadvertent issue.	WHC-SP-0866
11.12.1[2.2]	Control and calibration requirements for M&TE apply to both on-site and off-site calibration facilities and nonnuclear facility contractor or subcontractor groups that are engaged in maintenance activities.	WHC-SP-0866
11.12.3.2a.[1.2]	If repair or calibration of a standard is necessary, the recalibration must be traceable to the National Institute of Standards and Technology or to the standard of record for the M&TE.	WHC-SP-0866
11.14.3.1[1.1]	Standards must be communicated effectively to all personnel so that they are clearly understood.	WHC-SP-0866
11.14.3.7[3]	Followup of selected corrective action from previous inspections is necessary for evaluating the timeliness and effectiveness of the corrective action and obtaining the maximum benefit from the inspection program. Several methods may be used to accomplish this followup.	WHC-SP-0866
11.15.3.1[1.7]	Further guidance on some techniques that may be used to conduct facility inspections is given in Section 14.	
11.15.3.3[3.1]	The maintenance manager, and sometimes the facility manager, may address specific groups on topics related to team integration, productivity, and motivation.	WHC-SP-0866
11.16.2[1.2]	This system may be maintained centrally or locally by the individual group responsible for collecting the data.	WHC-SP-0866
11.16.3.1a.[1.2]	Systems and components that affect safe and reliable facility operation are obvious candidates for the program.	WHC-SP-0866
11.17.3.1[1.2]	This may include diagnostic information (such as vibration measurements, infrared heat distribution profiles, lube oil sample analysis, and previous operating and maintenance history), operating procedures, vendor-recommended maintenance requirements, maintenance schedules, recommended maintenance that was not accomplished, information related to personnel training and qualifications, adequacy of communications, maintenance procedures, and relevant information from documentation of maintenance history.	WHC-SP-0866
11.17.3.1[1.5]	A walk-through of how they have performed the task may be used as part of the interview.	WHC-SP-0866
11.17.3.3[2]	A walk-through task analysis may be utilized to supplement other techniques described here.	WHC-SP-0866
11.17.3.3[3]	Fault tree analysis is a systematic approach, similar to the management oversight and risk tree (MORT) process, which may be used when the problem is known but the cause is not clear.	WHC-SP-0866
11.17.3.3[4]	Change analysis is used when the problem is obvious.	WHC-SP-0866

Criteria	DOE Order 4330.4A, "Maintenance Management Program"	Mandatory
11.17.3.3[5]	Barrier analysis is a systematic questioning process that can be used when the problem appears to be programmatic.	WHC-SP-0866
11.17.3.3[6.1]	One effective general approach is to employ a team of experts headed by an experienced, independent leader to systematically track causes and effects to successively more generic levels until a root cause(s) that meet the three necessary criteria is identified.	WHC-SP-0866
11.17.3.3[6.2]	The team may include experts in system operation and testing, maintenance and repair techniques, materials, and failure analysis.	WHC-SP-0866
11.17.3.3[6.3]	No matter what technique is used, direct involvement by applicable line managers and supervisors in this process is essential to consistently achieve the desired long-range improvements.	WHC-SP-0866
11.17.3.3[7]	Care must be taken not to limit analysis to merely addressing the symptoms of a problem.	WHC-SP-0866
11.17.3.4[1.2]	The plan may be as simple as initiating a maintenance request for repair, changing a preventive maintenance frequency, counseling personnel, or modifying the training program slightly.	WHC-SP-0866
11.17.3.4[1.3]	It may also be extensive, such as developing and installing a major modification, procuring long lead time parts and materials, contracting for specialized service, revising procedures, and training personnel for continued operation and maintenance of the installation.	WHC-SP-0866
11.17.3.5[1.3]	Closely monitoring the equipment during an extended period of operation to provide sufficient assurance that the cause or causes have been properly addressed may also be necessary.	WHC-SP-0866
11.17.3.5[1.4]	Similar long-term followup is appropriate to determine whether the desired results are obtained from such corrective actions as retraining, procedural changes, and preventive maintenance changes.	WHC-SP-0866
11.19.1.3[2]	The plan will detail the actions and requirements to be imposed on the facility to assure protection of the equipment/ facility from cold weather or freezing.	WHC-SP-0866
11.19.1.3[3]	The plan will ensure that, in all cases, the actions and requirements imposed to provide cold weather/freeze protection, particularly prior to those taken to restrict or cutoff nuclear systems coolant, will be reviewed by facility operations and safety personnel to assure that the facility will be maintained in a safe condition to protect the health and safety of the public.	WHC-SP-0866

DOE Order 5000.3B, Occurrence Reporting and Processing of Operations Information

The following Reference(s) have been cited in the attached DOE Order 5000.3B, "Occurrence Reporting and Processing of Operations Information," Compliance Assessment.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5000.3B, "Occurrence Reporting and Processing of Operations Information"	Mandatory
7.[1]	Reportable Occurrences shall be categorized and notifications made and reports prepared as described in this Order.	WHC-CM-1-3
7.[2]	Attachment 1 to this Order, CATEGORIZATION OF REPORTABLE OCCURRENCES, shall be used to establish facility specific reporting requirements, and their categorizations.	WHC-CM-1-3
7.[3]	Categorization, notification, and reporting of occurrences that involve classified subject matter shall also be performed in accordance with the requirements of this Order.	WHC-CM-1-3
7.[4]	However, under no circumstances shall classified information or Occurrence Reports be entered onto the ORPS data base.	WHC-CM-1-3
7.[5]	Also, since classified information cannot be entered onto the ORPS data base, the Notification and Occurrence Reports (10-Day and Final) shall be prepared in written form, distributed to the DOE Facility Representative and the DOE Program Manager, and handled in accordance with the existing DOE Orders noted above regarding classified material.	WHC-CM-1-3
7.[6]	Unclassified versions, after review and removal of classified material/information by a classification official, shall be entered onto the ORPS data base by the Facility Manager.	WHC-CM-1-3
7.a.[1]	Categorization of Reportable Occurrences shall be made as soon as practical and, in all cases, within 2 hours of identification.	WHC-CM-1-3
7.a.[2]	If categorization is not clear, then the occurrence shall be initially categorized at the higher level being considered and DOE notified in accordance with this Order.	WHC-CM-1-3
7.a.[3]	The occurrence categorization shall either be elevated, maintained, or lowered as information is made available.	WHC-CM-1-3
7.b.(1)[1]	Requirements for oral and documented notification of Reportable Occurrences are as follows: Oral notification to DOE and offsite authorities of emergencies shall be made within 15 minutes or less of categorization.	WHC-CM-1-3
7.b.(1)[2]	A Notification Report shall be prepared and submitted as soon as practical but, in all cases, within 24 hours of categorization.	WHC-CM-1-3
7.b.(1)[3]	If the requirements of DOE Order 5500.2B have been implemented, then all oral notification requirements shall be satisfied in accordance with DOE Order 5500.2B.	WHC-CM-1-3
7.b.(2)[1]	Oral notification to DOE of unusual occurrences shall be as soon as sufficient information is obtained to indicate general nature and extent of the occurrence but, in all cases, within 2 hours of categorization.	WHC-CM-1-3
7.b.(2)[2]	A Notification Report shall be prepared and submitted within 24 hours of categorization.	WHC-CM-1-3
7.b.(3)	For off-normal occurrences, oral notification to DOE is not mandatory; however, a Notification Report shall be prepared and submitted within 24 hours of categorization.	WHC-CM-1-3
7.b.(4)[1]	Any changes in categorization shall be documented in a 10-Day Occurrence Report and submitted before the close of the next business day from the time of recategorization (not to exceed 80 hours).	WHC-CM-1-3
7.b.(4)[2]	A justification for the new categorization shall be included in the report.	WHC-CM-1-3

Criteria	DOE Order 5000.3B, "Occurrence Reporting and Processing of Operations Information"	Mandatory
7.c.(1)	In addition to the initial oral notifications required in Paragraph 7b, follow-up oral notification shall also be made to DOE for any of the following: Any further degradation in the level of safety of the facility or other worsening conditions, including those that require the declaration of any of the emergency action levels, if such a declaration has not been previously made;	WHC-CM-1-3
7.c.(2)	In addition to the initial oral notifications required in Paragraph 7b, follow-up oral notification shall also be made to DOE for any of the following: Any change from one emergency action level or category to another;	WHC-CM-1-3
7.c.(3)	In addition to the initial oral notifications required in Paragraph 7b, follow-up oral notification shall also be made to DOE for any of the following: Termination of an emergency.	WHC-CM-1-3
7.d.	An Occurrence Report shall be prepared for all Reportable Occurrences, according to the instructions provided in Attachment II, INSTRUCTIONS FOR COMPLETING AN OCCURRENCE REPORT.	WHC-CM-1-3
7.d.(1)	The submission of Occurrence Report information is required as follows: The Notification Report shall be prepared as required in Paragraphs 7b and 8a(10) of this Order;	WHC-CM-1-3
7.d.(2)	The submission of Occurrence Report information is required as follows: Within 10 working days of categorization, the contractor shall submit an Occurrence Report utilizing the information available at that time;	WHC-CM-1-3
7.d.(3)	The submission of Occurrence Report information is required as follows: The Occurrence Report shall be updated when significant new information is available;	WHC-CM-1-3
7.d.(4)	The submission of Occurrence Report information is required as follows: The final Occurrence Report shall be prepared and distributed by the contractor in accordance with this Order when the cause of the occurrences has been analyzed, root cause and contributing causes determined, corrective actions determined and scheduled, and lessons learned identified.	WHC-CM-1-3
7.e.(2).[1]	At these facilities, a log or other equivalent record will be maintained of reports submitted to the AC, including the date and time of submission, the individual who proposed them, the date and time of AC review, and the AC's name and position.	WHC-CM-1-3
7.e.(2).[2]	In addition, at DOE facilities where UCNI operations are conducted or UCNI may be generated, Occurrence Reports determined to be unclassified shall be reviewed by a Reviewing Official in order to identify if UCNI is present.	WHC-CM-1-3
7.e.(3).[1]	The Facility Manager, after a review by an AC and removal of all classified material, shall then enter the sanitized reports onto ORPS.	WHC-CM-1-3
7.e.(3).[2]	In addition, reports sanitized of classified information shall be reviewed by a Reviewing Official in order to identify if UCNI is present.	WHC-CM-1-3
8.a.(1)	The facility staff and operators shall identify and promptly notify the Facility Manager of abnormal events and conditions and record and archive all information pertaining to such occurrences.	WHC-CM-1-3
8.a.(2)	Appropriate immediate response(s) shall be taken by contractor operations personnel to stabilize or return the facility/operation to a safe condition.	

Criteria	DOE Order 5000.3B, "Occurrence Reporting and Processing of Operations Information"	Mandatory
8.a.(3)	The Facility Manager shall categorize the occurrence as required in Paragraph 7a of this Order utilizing the facility specific procedures developed in accordance with Paragraph 8d(2) of this Order.	WHC-CM-1-3
8.a.(4)	The Facility Manager or his or her designee shall be available at all times to carry out the requirements of this Order.	WHC-CM-1-3
8.a.(5)[1]	For oral notification, the Facility Manager shall simultaneously contact the DOE Facility Representative and the HQ EOC through which the DOE Program Manager or his or her designee and any other necessary program staff can be located and direct communications links with the Facility Manager established.	WHC-CM-1-3
8.a.(10)[1]	The Facility Manager shall prepare and submit the Notification Report (fields 1 through 18 of the Occurrence Report), and distribute it to the DOE Facility Representative and Program Manager within 24 hours of categorization of the occurrence.	WHC-CM-1-3
8.b.(1)(a)	For every Reportable Occurrence, the Facility Manager shall determine and document in the Occurrence Report as soon as practical: The significance, nature and extent of the event or condition;	WHC-CM-1-3
8.b.(1)(b)	For every Reportable Occurrence, the Facility Manager shall determine and document in the Occurrence Report as soon as practical: The cause(s) of the event or condition, including the root cause(s) as appropriate;	WHC-CM-1-3
8.b.(1)(c)	For every Reportable Occurrence, the Facility Manager shall determine and document in the Occurrence Report as soon as practical: The corrective actions to be taken to correct the condition and prevent recurrence.	WHC-CM-1-3
8.b.(2)[1]	Within 10 working days of categorization, the Facility Manager shall submit an Occurrence Report in accordance with subparagraph (6) below.	WHC-CM-1-3
8.b.(2)[2]	For hard copy reports (i.e., classified reports), the 10-day report shall include any updated information provided by the DOE Facility Representative in accordance with subparagraph (3) below.	WHC-CM-1-3
8.b.(2)[4]	For recurring occurrences identified in 8a (3) above (after receiving the required concurrences), a 10-Day Update Report shall be submitted with the new information by the close of the next business day from the time of categorization (not to exceed 80 hours).	WHC-CM-1-3
8.b.(4)[1]	The Final Occurrence Report shall be prepared, signed by the Facility Manager and submitted to the DOE Facility Representative as a final report when the cause of the occurrence has been analyzed, root cause and contributing causes determined, corrective actions determined and scheduled, and lessons-learned identified.	WHC-CM-1-3
8.b.(4)[2]	This report shall be submitted to the DOE Facility Representative within 45 days of categorization of the occurrence.	WHC-CM-1-3
8.b.(4)[3]	If the required analysis cannot be completed within 45 days, an update to the 10-Day Occurrence Report shall be submitted within the 45 days and shall include a detailed explanation of the delay and an estimated date for submittal of the Final Occurrence Report.	
8.b.(5).[1]	The revised Final Occurrence Report shall be resubmitted within 21 days if disapproval.	

Criteria	DOE Order 5000.3B, "Occurrence Reporting and Processing of Operations Information"	Mandatory
8.b.(6)[1]	The Occurrence Reports (10-day and final) shall be prepared by the Facility Manager and distributed to the Program Manager, the affected program self-assessment group, PSDs, the Heads of all Field Organizations, the DOE Facility Representative, Office of Nuclear Safety (NS-1), Office of Environmental Safety and Health (EH-1), all DOE Management and Operations (M&O) contractors, the Office of Nuclear Safety Policy and Standards (NE-70), the Defense Nuclear Facility Safety Board (DNFSB), and the Advisory Committee on Nuclear Facility Safety (ACNFS).	
8.b.(6)[2]	When unclassified Occurrence Reports (10-day and final) are entered onto the DOE ORPS data base, Paragraph 8c(1) below, by the Facility Manager, the distribution requirement is automatically satisfied.	WHC-CM-1-3
8.b.(9)[1]	Contractors shall maintain the Operational Data Base (Paragraph 8c(1) below) up-to-date on the status of Occurrence Report corrective actions.	WHC-CM-1-3
8.b.(9)[2]	Status reports of all incomplete Occurrence Reports (not final) and incomplete corrective actions shall be available at any time from the Operational Data Base.	WHC-CM-1-3
8.c.(1)[1]	The Occurrence Report documentation and distribution requirements of this Order shall be satisfied by utilization of ORPS, with the exception of those Occurrence Reports containing classified information.	WHC-CM-1-3
8.c.(1)[2]	These classified Occurrence Reports will be prepared in written form, and only after removal of classified material (Paragraph 7e above), can the reports be entered into the ORPS data base.	WHC-CM-1-3
8.c.(1)[3]	The information in the data base shall be available to all Departmental Elements and DOE operating contractors.	WHC-CM-1-3
8.c.(2)[1]	Contractors for each facility or group of facilities shall collect and disseminate to their personnel the operations information obtained from their facilities and the lessons to be learned from this information.	WHC-CM-1-3

DOE Order 5400.1, General Environmental Program

The following Reference(s) have been cited in the attached DOE Order 5400.1, "General Environmental Program," Compliance Assessment.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-2, *Quality Assurance Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-7-5, *Environmental Compliance Manual*, Westinghouse Hanford Company, Richland, Washington.

DOE/RL-89-12, *Hanford Site Groundwater Protection Management Program*

DOE/RL-89-18, *United States Department of Energy - Richland Operations Office Environmental Protection Implementation Plan - November 9, 1989 to November 19, 1990*

DOE/RL-91-49, *United States Department of Energy - Richland Field Office Environmental Protection Implementation Plan - November 9, 1991 to November 9, 1992*

DOE/RL-91-50, *Environmental Monitoring Plan: United States Department of Energy, Richland Field Office*

WHC-EP-0438, *A Guide for Preparing Hanford Facility Effluent Monitoring Plans*

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Criteria	DOE Order 5400.1, "General Environmental Program"	Mandatory
II .2.(a)[1]	Consistent with the notification requirements contained in DOE 5484.1 and DOE 5000.3A, and the DOE orders in the 5500 series dealing with emergency management, field organizations and DOE contractors shall notify the Headquarters Emergency Operations Center (EOC) of the significant nonroutine release of any pollutant or hazardous substance, e.g., releases of hazardous substances that are reported to the Environmental Protection Agency National Response Center as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).	WHC-CM-1-3 WHC-CM-7-5
III.2. [2]	An implementation plan shall be prepared for each facility or group of facilities, the purpose of which is to provide management direction, including assignment of responsibilities and authorities, to ensure that all DOE facilities are operated and managed in a manner that will protect, maintain, and, where necessary, restore environmental quality, minimize potential threats to the environment and the public health, and comply with environmental regulations and DOE policies.	DOE/RL-89-18, DOE/RL-91-49
IV. 5.a.(1)(a)	Effluent monitoring shall be conducted at all DOE sites to satisfy the following program objectives: Verify compliance and applicable Federal, State, and local effluent regulations and DOE Orders.	WHC-CM-7-5, WHC-EP-0438
IV. 5.a.(1)(b)	Effluent monitoring shall be conducted at all DOE sites to satisfy the following program objectives. Determine compliance with commitments made in Environmental Impact Statements, Environmental Assessments, or other official documents.	WHC-CM-7-5, WHC-EP-0438
IV. 5.a.(1)(c)	Effluent monitoring shall be conducted at all DOE sites to satisfy the following program objectives: Evaluate the effectiveness of effluent treatment and control.	WHC-CM-7-5, WHC-EP-0438
IV. 5.a.(1)(d)	Effluent monitoring shall be conducted at all DOE sites to satisfy the following program objectives: Identify potential environmental problems and evaluate the need for remedial actions or mitigation measures.	WHC-CM-7-5, WHC-EP-0438
IV. 5.a.(1)(e)	Effluent monitoring shall be conducted at all DOE sites to satisfy the following program objectives: Support permit revision and/or reissuance.	WHC-CM-7-5, WHC-EP-0438
IV. 5.a.(1)(f)	Effluent monitoring shall be conducted at all DOE sites to satisfy the following program objectives: Detect, characterize, and report unplanned releases.	WHC-CM-7-5, WHC-EP-0438
IV. 5.a.(2)	Effluent monitoring shall comply with applicable regulations and shall be conducted to provide representative measurements of the quantities and concentrations of pollutants in liquid and airborne discharges, and solid wastes.	WHC-CM-7-5
IV. 5.a.(2)(a)[1]	Effluents from on-site waste treatment or disposal systems shall be monitored in accordance with applicable regulations.	WHC-CM-7-5
IV. 5.a.(2)(b)[1]	Sample collection programs shall reflect specific facility needs.	WHC-CM-7-5
IV. 5.a.(2)(b)[2]	Type and frequency of sampling shall be adequate to characterize effluent streams.	
IV. 5.a.(2)(c)[1]	Standard analyses shall be used to analyze samples whenever such methods are required by regulatory.	
IV. 5.a.(2)(d)	Auditable records shall be established in accordance with the requirements of DOE 5700.6B.	WHC-CM-4-2

Criteria	DOE Order 5400.1, "General Environmental Program"	Mandatory
IV. 5.b.(1) [1]	Environmental surveillance shall be conducted to monitor the effects, if any, of DOE activities on on-site and offsite environmental and natural resources.	DOE/RL-91-49, DOE/RL-91-50
IV. 5.b.(1) [2]	An environmental surveillance screening program shall be undertaken at DOE sites to determine the need for a permanent surveillance program.	DOE/RL-91-49, DOE/RL-91-50
IV. 5.b.(1)(a)	Environmental surveillance shall be designed to satisfy one or more of the following program objectives: Verify compliance with applicable environmental laws and regulations.	DOE/RL-91-49, DOE/RL-91-50
IV. 5.b.(1)(b)	Environmental surveillance shall be designed to satisfy one or more of the following program objectives: Verify compliance with environmental commitments made in Environmental Impact Statements, Environmental Assessments, Safety Analysis Reports, or other official DOE documents;	DOE/RL-91-49, DOE/RL-91-50
IV. 5.b.(1)(c)	Environmental surveillance shall be designed to satisfy one or more of the following program objectives: Characterize and define trends in the physical, chemical and biological condition of environmental media;	DOE/RL-91-49, DOE/RL-91-50
IV. 5.b.(1)(d)	Environmental surveillance shall be designed to satisfy one or more of the following program objectives: Establish baselines of environmental quality;	DOE/RL-91-49, DOE/RL-91-50
IV. 5.b.(1)(e)	Environmental surveillance shall be designed to satisfy one or more of the following program objectives: Provide a continuing assessment of pollution abatement programs;	DOE/RL-91-49, DOE/RL-91-50
IV. 5.b.(1)(f)	Environmental surveillance shall be designed to satisfy one or more of the following program objectives: Identify and quantify new or existing environmental quality problems.	DOE/RL-91-49, DOE/RL-91-50
IV. 6.	Representative meteorological data are required at DOE facilities to support environmental monitoring activities.	DOE/RL-91-50
IV. 6.a.[1]	A meteorological information/monitoring program shall be developed as a specific element of all environmental monitoring plans.	DOE/RL-91-50
IV. 6.a.[2]	The program shall identify types of meteorological information required to support all environmental protection activities (both routine and non-routine) and the regulations applicable to assessing impacts of airborne releases.	DOE/RL-91-50
IV. 6.a.[3]	The elements of the program...shall be specified and the rationale or purpose for selecting those elements documented.	DOE/RL-91-50
IV. 6.b.(1)	Representative meteorological information shall be available at or in the vicinity of DOE facilities to: Provide data to characterize atmospheric transport, diffusion conditions, and other climatic conditions of importance in the vicinity of the DOE facility for assessments of the impacts of airborne releases (both routine and non-routine) on public health and safety;	DOE/RL-91-50
IV. 6.b.(2)	Representative meteorological information shall be available at or in the vicinity of DOE facilities to: Provide data to characterize conditions important to environmental surveillance activities such as air quality and radiation monitoring.	DOE/RL-91-50
IV. 6.b.(3)	Representative meteorological information shall be available at or in the vicinity of DOE facilities to: Provide data to confirm compliance with and implementation of applicable regulations and DOE Orders; and	DOE/RL-91-50

Criteria	DOE Order 5400.1, "General Environmental Program"	Mandatory
IV. 6.b.(4)	Representative meteorological information shall be available at or in the vicinity of DOE facilities to: Provide a consistent data base upon which decisions can be made concerning airborne releases and appropriate control activities.	DOE/RL-91-50
IV. 7.a.	Airborne radiation and radioactive materials discharged from DOE facilities shall comply with the requirements of 40 CFR Part 61, "National Emission Standards for Hazardous Air Pollutants."	WHC-CM-7-5
IV. 7.b.[1]	An assessment of the potential radiation dose to members of the public which could have resulted from site operations shall be made for facilities required to conduct effluent and environmental radiological monitoring.	WHC-CM-7-5
IV. 7.b.[2]	Assessments shall be made in accordance with the requirements of DOE Orders in the 5400 series dealing with radiation protection of the public and environment.	DEFERRED TO 5400.5
IV. 8.a.(1)[1]	Air emission monitoring shall be in accordance with the requirements of applicable Federal, State, and local regulations authorized by the Clean Air Act (42 U.S.C. 7401, et. seq)	WHC-CM-7-5
IV. 8.a.(3)[1]	Monitoring shall conform to the EPA PSD monitoring regulations (40 CFR Part 58) which contain siting, quality assurance, and accuracy requirements.	WHC-CM-7-5
IV. 8.a.(3)[2]	Siting of monitoring stations requires the use of atmospheric dispersion modeling to locate areas of expected maximum offsite impact.	WHC-CM-7-5
IV. 8.a.(3)[3]	The rules also identify specific reference methods and equivalent method analyses which shall be used for the program.	WHC-CM-7-5
IV. 8.b.(2)(a)	Particular attention shall be given to the following: 40 CFR Part 50, "National Primary and Secondary Ambient Air Quality Standards"	DOE/RL-91-49
IV. 8.b.(2)(b)	Particular attention shall be given to the following: 40 CFR Part 52, "State Implementation Plans"	DOE/RL-91-49
IV. 8.b.(2)(c)	Particular attention shall be given to the following: 40 CFR Part 53, "Ambient Air Monitoring Reference and Equivalent Methods"	DOE/RL-91-49
IV. 8.b.(2)(d)	Particular attention shall be given to the following: 40 CFR Part 58, "Ambient Air Quality Surveillance"	DOE/RL-91-49
IV. 8.c.(2)(a)	Where required, DOE facilities shall monitor liquid effluent discharges. Federal regulations defining NPDES requirements for monitoring nonradioactive effluents appear in the following: 40 CFR Part 123, "State Program Requirements"	WHC-CM-7-5
IV. 8.c.(2)(b)	Where required, DOE facilities shall monitor liquid effluent discharges. Federal regulations defining NPDES requirements for monitoring nonradioactive effluents appear in the following: 40 CFR Part 124, "Procedures for Decisionmaking"	WHC-CM-7-5
IV. 8.c.(2)(c)	Where required, DOE facilities shall monitor liquid effluent discharges. Federal regulations defining NPDES requirements for monitoring nonradioactive effluents appear in the following: 40 CFR Part 125, "Criteria and Standards for the National Pollutant Discharge Elimination System"	WHC-CM-7-5

Criteria	DOE Order 5400.1, "General Environmental Program"	Mandatory
IV. 8.c.(2)(d)	Where required, DOE facilities shall monitor liquid effluent discharges. Federal regulations defining NPDES requirements for monitoring nonradioactive effluents appear in the following: 40 CFR Part 129, "Toxic Pollutant Effluent Standards"	WHC-CM-7-5
IV. 8.c.(4)[1]	In addition to rules promulgated under the Clean Water Act, DOE facilities shall satisfy monitoring requirements called for under the Resource Conservation and Recovery Act (RCRA), as amended, since under RCRA, a solid waste can be a liquid.	WHC-CM-7-5
IV. 8.c.(4)[2]	Under RCRA, it shall first be determined if a waste is hazardous.	WHC-CM-7-5
IV. 8.c.(4)[3]	If a waste is determined to be hazardous, the applicable regulations in 40 CFR Parts 260 through 280 shall be implemented.	WHC-CM-7-5
IV. 8.d.(5)[1]	Surface water sampling performed at fixed monitoring stations will characterize physical and chemical properties of the water column and sediments, and biological species in the water column and benthos.	DOE/RL-91-49
IV. 8.d.(6)[1]	Data collected shall be representative of the variations in water quality and changes in pollutant loads.	DOE/RL-91-49
IV. 9.	Groundwater that is or could be affected by DOE activities shall be monitored to determine and document the effects of operations on groundwater quality and quantity and to demonstrate compliance with DOE requirements and applicable Federal, State, and local laws and regulations.	DOE/RL-91-50
IV. 9.a.[1]	A groundwater monitoring plan shall be developed as a specific element of all environmental monitoring plans and the Groundwater Protection Management Program required in page III 2, subparagraph 4a.	DOE/RL-91-50
IV. 9.a.[2]	The plan shall identify all DOE requirements and regulations applicable to groundwater protection and include monitoring strategy.	DOE/RL-91-50
IV. 9.a.[3]	The elements of the groundwater monitoring program shall be specified (sampling plan, sampling, analysis, and data management), as shall the rationale of purpose for selecting these elements.	DOE/RL-91-50
IV. 9.b.(1)	Groundwater monitoring programs shall be conducted on-site and in the vicinity of DOE facilities to: Obtain data for the purpose of determining baseline conditions of groundwater quality and quantity.	DOE/RL-91-50
IV. 9.b.(2)	Groundwater monitoring programs shall be conducted on-site and in the vicinity of DOE facilities to: Demonstrate compliance with an implementation of all applicable regulations and DOE Orders;	DOE/RL-89-12, DOE/RL-91-50
IV. 9.b.(3)	Groundwater monitoring programs shall be conducted on-site and in the vicinity of DOE facilities to: Provide data to permit the early detection of groundwater pollution or contamination;	DOE/RL-91-50
IV. 9.b.(4)	Groundwater monitoring programs shall be conducted on-site and in the vicinity of DOE facilities to: Provide a reporting mechanism for detected groundwater pollution or contamination.	DOE/RL-91-50
IV. 9.b.(5)	Groundwater monitoring programs shall be conducted on-site and in the vicinity of DOE facilities to: Identify existing and potential groundwater contamination sources and to maintain surveillance of these sources;	DOE/RL-91-50

Criteria	DOE Order 5400.1, "General Environmental Program"	Mandatory
IV. 9.b.(6)	Groundwater monitoring programs shall be conducted on-site and in the vicinity of DOE facilities to: Provide data upon which decisions can be made concerning land disposal practices and the management and protection of groundwater resources.	WHC-CM-7-5
IV. 9.c.[1]	Site-specific characteristics shall determine monitoring needs.	DOE/RL-91-50
IV. 9.c.[2]	Where appropriate, groundwater monitoring programs shall be designed and implemented in accordance with 40 CFR Part 264, Subpart F, or 40 CFR Part 265, Subpart F.	WHC-CM-7-5
IV.10.a. [1]	A quality assurance program consistent with DOE 5700.6B shall be established covering each element of environmental monitoring and surveillance programs commensurate with its nature and complexity.	WHC-CM-7-5
IV.10.a.(1)	The quality assurance program shall include, but not be limited to, the following: Organizational responsibility;	WHC-CM-4-2
IV.10.a.(2)	The quality assurance program shall include, but not be limited to, the following: Program design;	WHC-CM-4-2
IV.10.a.(3)	The quality assurance program shall include, but not be limited to, the following: Procedures;	WHC-CM-4-2
IV.10.a.(4)	The quality assurance program shall include, but not be limited to, the following: Field quality control;	WHC-CM-4-2
IV.10.a.(5)	The quality assurance program shall include, but not be limited to, the following: Laboratory quality control;	WHC-CM-4-2
IV.10.a.(6)	The quality assurance program shall include, but not be limited to, the following: Human factors;	
IV.10.a.(7)	The quality assurance program shall include, but not be limited to, the following: Recordkeeping;	WHC-CM-4-2
IV.10.a.(8)	The quality assurance program shall include, but not be limited to, the following: Chain-of-custody procedures;	WHC-CM-4-2
IV.10.a.(9)	The quality assurance program shall include, but not be limited to, the following: Audits;	WHC-CM-4-2
IV.10.a.(10)	The quality assurance program shall include, but not be limited to, the following: Performance reporting; and	WHC-CM-4-2
IV.10.a.(11)	The quality assurance program shall include, but not be limited to, the following: Independent data verification.	WHC-CM-4-2
IV.10.b.[1]	DOE and DOE contractor laboratories shall confirm the need and apply for any certification requirements with appropriate Federal, State or local agencies.	WHC-CM-7-5
IV.10.b.[2]	Where DOE operations secure the support of outside contractor laboratories, this work shall be conducted by appropriately certified laboratories.	WHC-CM-7-5
IV.10.c.[1]	All DOE and contractor laboratories that conduct analytical work in support of DOE environmental radiological monitoring programs for radioactive materials shall participate in the DOE interlaboratory quality assurance program coordinated by the DOE Environmental Measurements Laboratory, New York, New York.	WHC-CM-7-5

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DOE Order 5400.5, DOE Radiation Protection of the Public and the Environment

The following Reference(s) have been cited in the attached DOE Order 5400.5, "DOE Radiation Protection of the Public and the Environment", Compliance Assessments.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-6, *WHC Radiological Control Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-3-5, *Document Control and Records Management Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-11, *ALARA Program Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-7-5, *Environmental Compliance Manual*, Westinghouse Hanford Company, Richland, Washington.

DOE/RL-91-49, *United States Department of Energy - Richland Field Office Environmental Protection Implementation Plan - November 9, 1991 to November 9, 1992*

DOE/RL-91-50, *Environmental Monitoring Plan: United States Department of Energy, Richland Field Office*

WHC-EP-0137, *Best Available Technology Economically Achievable Guidance Document For The Hanford Site Waste Management Systems Engineering*, Westinghouse Hanford Company, Richland, Washington.

WHC-EP-0498, *Unit Dose Calculation Methods and Summary of Facility Effluent Monitoring Plan Determinations*, Westinghouse Hanford Company, Richland, Washington.

HEDOP, *Hanford Environmental Dose Overview Program*, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5400.5, "DOE Radiation Protection of the Public and the Environment"	Mandatory
II.1.a. [1]	Except as provided by II.1a(4), the exposure of members of the public to radiation sources as a consequence of all routine DOE activities shall not cause, in a year, an effective dose equivalent greater than 100 mrem (1 mSv).	WHC-CM-7-5
II.1.a.(2)[1]	Other than for sources specifically excepted, doses to members of the public from all exposure modes that could contribute significantly to the total dose shall be considered for evaluation.	WHC-CM-7-5
II.1.a.(3)	In addition, DOE operators are required to report DOE-related effective dose equivalent contributions of 10 mrem (0.10 mSv) or more in a year (see paragraph II.7).	WHC-CM-7-5
II.1.a.(3)(a)[1]	Except for medical sources, consumer products, residual fallout from past nuclear accidents and weapons tests, and naturally occurring radiation sources, DOE operators shall make a reasonable effort to be aware of the existence of other than DOE man-made sources of radiation which, combined with the DOE sources, might present a potential for exceeding contributions of 10 mrem (0.1 mSv) effective dose equivalent in a year.	DOE/RL-91-49
II.1.a.(3)(a)[2]	EH-1 and the appropriate headquarters Project Offices shall be notified if the 100-mrem in a year dose limit cannot be achieved.	WHC-CM-1-3, WHC-CM-7-5
II.1.b.	To the extent required by the Clean Air Act, the exposure of members of the public to radioactive materials released to the atmosphere as a consequence of routine DOE activities shall not cause members of the public to receive, in a year, an effective dose equivalent greater than 10 mrem (0.1 mSv).	WHC-CM-7-5
II.1.b.(2)[1]	To demonstrate compliance analytically with air emissions for the Clean Air Act Standards, doses to the individuals shall be evaluated using the version of AIRDOS/RADRIK known as CAP-88 or, when available and approved, AIRDOS-PC.	WHC-CM-7-5
II.1.c.	To the extent required by 40 CFR Part 191, the exposure of members of the public to direct radiation or radioactive material released from DOE management and storage activities at a disposal facility for spent nuclear material or for high-level or transuranic radioactive wastes that are not regulated by the NRC shall not cause members of the public to receive, in a year, a dose equivalent greater than 25 mrem (0.25 mSv) to the whole body or a committed dose equivalent greater than 75 mrem (0.75 mSv) to any organ.	WHC-CM-7-5
II.1.c.(1)	Other requirements and guidelines for the management and storage of spent nuclear fuel and high-level and transuranic waste at DOE facilities that are not licensed by the NRC are given in DOE 5820.2A.	WHC-CM-7-5
II.1.c.(2)[1]	It is Departmental policy that DOE facilities and operations will comply fully with the requirements of those and other applicable regulatory requirements.	WHC-CM-7-5
II.1.c.(2)[2]	In addition, these same DOE facilities and operations shall comply with all applicable requirements in this Order unless they are duplicative or conflict with any of the other Federal regulatory requirements.	WHC-CM-7-5
II.1.d. [1]	It is the policy of DOE to provide a level of protection for persons consuming water from a public drinking water supply operated by the DOE, either directly or through a DOE contractor, that is equivalent to that provided to the public by the public community drinking water standards of 40 CFR part 141.	WHC-CM-7-5

Criteria	DOE Order 5400.5; "DOE Radiation Protection of the Public and the Environment"	Mandatory
II.1.d. [2]	These systems shall not cause persons consuming the water to receive an effective dose equivalent greater than 4 mrem (0.04 mSv) in a year.	WHC-CM-7-5
II.1.d. [3]	Combined radium-226 and radium-228 shall not exceed 10E-9 micro Ci/ml and gross alpha activity (including radium-226 but excluding radon and uranium) shall not exceed 1.10 e-8 micro Ci/ml.	WHC-CM-7-5
II.1.d.(3)	The liquid effluents from DOE activities shall not cause private or public drinking water systems downstream of the facility discharge to exceed the drinking water radiological limits in 40 CFR Part 141.	WHC-CM-7-5
II.2.	Field Elements shall develop a program and shall require contractors to implement the ALARA Process for all DOE activities and facilities that cause public doses.	WHC-CM-1-3
II.2.a.[1]	ALARA requires judgment with respect to what is reasonably achievable.	WHC-CM-4-11
II.2.a.[2]	Factors that relate to societal, technological, economic, and other public policy considerations shall be evaluated to the extent practicable in making such judgments.	
II.2.a.(1)	Factors to be considered, at a minimum, shall include: The maximum dose to members of the public;	WHC-CM-1-6, WHC-CM-4-11
II.2.a.(2)	Factors to be considered, at a minimum, shall include: The collective dose to the population;	
II.2.a.(3)	Factors to be considered, at a minimum, shall include: Alternative processes, such as alternative treatments of discharge streams, operating methods, or controls;	WHC-CM-1-3 WHC-CM-7-5
II.2.a.(4)	Factors to be considered, at a minimum, shall include: Doses for each process alternative.	WHC-CM-4-11
II.2.a.(5)	Factors to be considered, at a minimum, shall include: Costs for each of the technological alternatives;	
II.2.a.(6)	Factors to be considered, at a minimum, shall include: Examination of the changes in cost among alternatives;	
II.2.a.(7)	Factors to be considered, at a minimum, shall include: Changes in societal impact associated with process alternatives, e.g., differential doses from various pathways;	
II.3.a.(1)[1]	The BAT selection process shall be implemented in accordance with II.3a(1)(a) and (b), below.	WHC-CM-7-5
II.3.a.(1)[2]	Although there is no known practicable method for removing tritium from liquid waste streams, facilities and operations are to be designed and operated so that tritium sources and releases are considered in the ALARA process.	WHC-CM-7-5
II.3.a.(1)(a)	Selection of the best available technology for a specific application will be made from among candidate alternative treatment technologies which are identified by an evaluation process that includes factors related to technology, economics, and public policy considerations.	WHC-EP-0137
II.3.a.(1)(a)1	Factors that are to be considered in selecting BAT, at a minimum, shall include: the age of equipment and facilities involved;	WHC-EP-0137

Criteria	DOE Order 5400.5, "DOE Radiation Protection of the Public and the Environment"	Mandatory
11.3.a.(1)(a)2	Factors that are to be considered in selecting BAT, at a minimum, shall include: the process employed;	WHC-EP-0137
11.3.a.(1)(a)3	Factors that are to be considered in selecting BAT, at a minimum, shall include: the engineering aspects of the application of various types of control techniques;	WHC-EP-0137
11.3.a.(1)(a)4	Factors that are to be considered in selecting BAT, at a minimum, shall include: process changes;	WHC-EP-0137
11.3.a.(1)(a)5	Factors that are to be considered in selecting BAT, at a minimum, shall include: the cost of achieving such effluent reduction;	WHC-EP-0137
11.3.a.(1)(a)6	Factors that are to be considered in selecting BAT, at a minimum, shall include: non-water quality environmental impact (including energy requirements);	WHC-EP-0137
11.3.a.(1)(a)7	Factors that are to be considered in selecting BAT, at a minimum, shall include: safety considerations;	WHC-EP-0137
11.3.a.(1)(a)8	Factors that are to be considered in selecting BAT, at a minimum, shall include: public policy considerations.	WHC-CM-7-5
11.3.a.(1)(b)[1]	A plan and schedule to install waste treatment systems in existing facilities, if justified by a BAT analysis, shall be developed within 6 months of the issuance date of this Order, to permit compliance with paragraph 11.3a(1) at the earliest practicable time.	WHC-CM-7-5
11.3.a.(1)(b)[2]	The plan shall include an ALARA section on tritium, where applicable.	
11.3.a.(1)(c)	The plan shall be submitted for approval to the responsible Operations Office manager and updated annually, consistent with the provisions of DOE 5820.2A for preparing and updating Waste Management Plans.	WHC-CM-7-5
11.3.a.(3)	For purposes of 11.3a(1), above, the DCG for liquid waste streams containing more than one type of radionuclide shall be the sum of the fractional DCG values.	WHC-CM-7-5
11.3.b.(1)[1]	The use of soil columns (i.e., trenches, cribs, ponds, and drain fields) to retain, by sorption or ion exchange, suspended or dissolved radionuclides from liquid waste streams shall be discontinued at the earliest practicable time in favor of an acceptable alternative disposal means.	WHC-CM-7-5
11.3.b.(1)[2]	DOE activities that currently discharge liquids containing radioactive materials not first treated by BAT to soil columns, shall develop, within 6 months of the issuance date of this Order, a plan and schedule for implementing alternate acceptable disposal at the earliest practicable time.	WHC-CM-7-5
11.3.b.(1)[3]	The BAT selection process shall be applied to those liquid waste streams that will continue to be discharged to soil columns for indefinite periods and which contain process-derived radionuclides.	WHC-CM-7-5
11.3.b.(1)[4]	The plan shall be submitted for approval to the respective Operations Office manager and updated annually, consistent with the provisions of DOE 5820.2A for preparing and updating Waste Management Plans.	WHC-CM-7-5

Criteria	DOE Order 5400.5, "DOE Radiation Protection of the Public and the Environment"	Mandatory
11.3.b.(2)	Except as permitted by the provisions in paragraph 11.3e(1), new or increased discharges of radionuclides in liquid waste to active soil columns and virgin soil columns shall be prohibited after the effective date of this Order.	WHC-CM-7-5
11.3.c.(1)	Contaminated soil columns, drainage systems, and ground water to which contaminated liquid discharges have been discontinued shall be managed or decontaminated pursuant to the procedures and requirements of DOE 5480.4 and in the 5400 series.	WHC-CM-7-5
11.3.c.(2)	Liquid discharges, even though uncontaminated, are prohibited in inactive release areas to prevent the further spread of radionuclides previously deposited.	WHC-CM-7-5
11.3.d.(1)	The BAT selection process shall be implemented if liquid wastes discharged from DOE activities into sanitary sewerage contain radionuclides at concentrations, averaged monthly, would otherwise be greater than five times the DCG values for liquids given in Chapter III at the point of discharge.	
11.3.d.(2)	That is, the BAT selection process shall be implemented if the total of the fractions of the average concentrations for each radionuclide to its respective DCG value would otherwise exceed 5.	WHC-CM-7-5
11.3.d.(2)	Concentrations shall be controlled so that long-term buildup of radionuclides in solids will not present a handling and disposal problem at sewage disposal plants.	
11.3.d.(3)(2)	However, ALARA process considerations are required.	WHC-CM-7-5
11.3.d.(3)(3)	Such a sewerage system will provide liquid waste treatment prior to discharge to surface waters in accordance with the requirements of paragraph 11.3a(1).	WHC-CM-7-5
11.3.e.(2)(1)	...process alternatives that reduce the amount of tritium entering the liquid waste streams shall be identified and evaluated in accordance with DOE ALARA policy.	WHC-CM-7-5
11.3.e.(2)(3)	A description and summary of the alternatives considered in the control of tritium releases shall be incorporated into the site Waste Management Plan required by DOE 5820.2A.	WHC-CM-7-5
11.5.c.(1)	Prior to being released, property shall be surveyed to determine whether both removable and total surface contamination... is greater than the levels given in Figure IV-1 and that the contamination has been subjected to the ALARA process.	WHC-CM-1-6
11.5.c.(2)	Property shall be considered to be potentially contaminated if it has been used or stored in radiation areas that could contain unconfined radioactive material or that are exposed to beams of particles capable of causing activation....	WHC-CM-1-6
11.5.c.(3)	Surfaces of potentially contaminated property shall be surveyed using instruments and techniques appropriate for detecting the limits stated in Figure IV-1.	WHC-CM-1-6
11.5.c.(5)(a)	The records of released property shall include: A description or identification of the property.	WHC-CM-1-6
11.5.c.(5)(b)	The records of released property shall include: The date of the last radiation survey.	WHC-CM-1-6
11.5.c.(5)(c)	The records of released property shall include: The identity of the organization and the individual who performed the monitoring operation.	WHC-CM-1-6

Criteria	DOE Order 5400.5, "DOE Radiation Protection of the Public and the Environment"	Mandatory
11.5.c.(5)(d)	The records of released property shall include: The type and identification number of monitoring instruments.	WHC-CM-1-6
11.5.c.(5)(e)	The records of released property shall include: The results of the monitoring operation.	WHC-CM-1-6
11.5.c.(5)(f)	The records of released property shall include: The identity of the recipient of the released material.	WHC-CM-1-6
11.6.	Compliance with the dose limits of this Order shall be demonstrated by documentation of an appropriate combination of measurements and calculations to evaluate potential doses and the results of the evaluations.	WHC-CM-7-5
11.6.b. [1]	Doses to members of the public in the vicinity of DOE activities shall be evaluated and documented to demonstrate compliance with the dose limits of this Order and to assess exposures of the public from unplanned events.	WHC-CM-7-5
11.6.b. [2]	Collective doses to the public within 80 km of the site shall also be evaluated and documented at least annually.	
11.6.b.(1)[1]	Analytical models used for dose evaluations shall be appropriate for characteristics of emissions...mode of release...environmental transport medium...and exposure pathway....	HEDOP
11.6.b.(1)[2]	Information on dispersion...in the environment, demography, land use...food supplies, and exposure pathways used in the dose calculations shall be appropriate to evaluate actual and potential doses in the environs of DOE facilities.	HEDOP
11.6.b.(1)[3]	Such information shall be updated as necessary to document significant changes that could affect dose evaluations.	HEDOP
11.6.b.(1)[4]	Dose evaluation models that are codified, approved, or accepted by regulatory or other authorities shall be used where appropriate, such as the AIRDOS/RAD RISK codes for demonstrating compliance with 40 CFR Part 61, Subpart H.	WHC-CM-1-3
11.6.b.(2)	Except as provided in paragraph 11.6b(2)(d), tables of approved dose conversion factors in paragraphs 11.6b(2)(a), (b), and (c), below, shall be used to evaluate doses unless otherwise legally required, e.g., use of AIRDOS/RAD RISK codes pursuant to 40 CFR Part 61, Subpart H.	WHC-CM-7-5
11.6.b.(2)(a)	The dose delivered to a body over the lifetime of the individual from a single committed dose conversion factors shall be used, as appropriate, and are presented in EPA-520/1-88-020, Federal Guidance Report No. 11, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation Submersion, and Ingestion," and in DOE/EH-0071, "Internal Dose Conversion Factors for Calculation of Dose to the Public."	WHC-CM-7-5
11.6.b.(2)(b)	The doses from exposure to external radiation from radionuclide concentrations in air and in water that result from submersion or from exposure to contaminated plane surfaces shall be estimated, as appropriate, using the external dose conversion factors presented in EPA-520/1-88-020, Federal Guidance Report No. 11, "Limiting Values of Radionuclides Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion" and in DOE/EH-0070, "External Dose-Rate Conversion Factors for Calculation of Dose to the Public."	WHC-CM-7-5

Criteria	DOE Order 5400.5, "DOE Radiation Protection of the Public and the Environment"	Mandatory
II.6.b.(2)(d)	Methods and alternatives other than those discussed above and as prescribed in applicable regulations shall be submitted to EH-1 for approval.	
II.6.b.(3)(a)[1]	Dose limits for members of the general public, from routine operation of a DOE activity, shall be expressed as a dose received by the individuals during the year...or the committed dose received by the individual over a period of 50 years from radionuclides taken into the body during the year.	WHC-CM-7-5
II.6.b.(3)(b)[2]	Consequently, the individuals subject to the greatest exposure shall be identified, to the extent practicable, so that the highest dose might be determined.	WHC-CM-7-5
II.6.b.(3)(c)[2]	Alternatively, if available data are not sufficient to evaluate these factors or if they are too costly to determine, the assumed parametric values shall be sufficiently conservative so that it is unlikely that individuals would actually receive a dose that would exceed the dose calculated using the values assumed.	
II.6.b.(3)(d)	Parametric values used in performing dose calculations shall be recorded.	
II.7.	In addition to the reporting requirements of DOE 5400.1 and DOE 5484.1, the responsible DOE Operations Office shall notify, in a timely manner, the relevant Program Office(s) and the Deputy Assistant Secretary for Environment (EH-20) of actual or potential exposures of members of the public that could result in either an effective dose equivalent from DOE sources exceeding 10 mrem (0.1 mSv) in a year; or exceeding any limit or not meeting any other requirement specified in this Order or any other legally applicable limits, or a combined dose equal to or greater than 100 mrem (1 mSv) effective dose equivalent in a year due to DOE and other man-made sources of radiation (medical, consumer products, and natural sources excepted).	WHC-CM-1-3, WHC-CM-7-5, DOE/RL-91-50
II.8.a.[1]	Records developed shall include information and data necessary to identify and characterize releases of radioactive material to the environment, their fate in the environment, and their probable impact on radiation doses to the public.	WHC-EP-0498 DOE/RL-91-50
II.8.a.[2]	Basic information used assess compliance with the requirements of this Order pursuant to paragraph II.6, and the results of such assessments, shall be incorporated as part of the record.	WHC-CM-7-5 WHC-CM-3-5
II.8.b.	Information and data developed pursuant to this Order shall be retained consistent with the requirements of DOE 1324.2 and other legally applicable requirements.	WHC-CM-7-5
II.9.	All reports, notifications, and records developed pursuant to DOE Order requirements shall present data in the units used in the applicable regulation or DOE order.	WHC-CM-7-5
IV.2.e.	Applications of ALARA policy shall be documented and filed as a permanent record.	WHC-CM-7-5
IV.4.a.	Guidelines for residual concentrations of other radionuclides shall be derived from the basic dose limits by means of an environmental pathway analysis using specific property data where available.	
IV.4.a.(1)[1]	If the average concentration in any surface or below-surface area less than or equal to 25 square meters, exceeds the limit or guideline by a factor of $(100/A)E-0.5$, [where A is the area (in square meters) of the region in which concentrations are elevated], limits for "hot-spots" shall also be developed and applied.	WHC-CM-7-5

Criteria	DOE Order 5400.5, "DOE Radiation Protection of the Public and the Environment"	Mandatory
IV.4.a.(1)(2)	In addition, reasonable efforts shall be made to remove any source of radionuclide that exceeds 30 times the appropriate limit for soil, irrespective of the average concentration in the soil.	
IV.4.a.(3)	If other mixtures of radionuclides occur, the concentrations of individual radionuclides shall be reduced so that either the dose for the mixtures will not exceed the basic dose limit or the sum of the ratios of the soil concentration of each radionuclide to the allowable limit for that radionuclide will not exceed 1.	WHC-CM-7-5
IV.4.b.(1)	Generic guidelines for concentrations of airborne radon decay products shall apply to existing occupied or habitable on private property that are intended for release habitable without restriction; structures that will be demolished or buried are excluded.	
IV.4.b.(2)	The applicable generic guideline (40 CFR Part 192) is: In any occupied or habitable building, the objective of remedial action shall be, and a reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL.	
IV.4.b.(3)	In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL.	
IV.4.c.(1)	In any case...the average level of gamma radiation inside a building or habitable structure on a site to be released without restrictions shall not exceed the background level by more than 20 micro R/h and shall comply with the basic dose limit when an "appropriate-use" scenario is considered.	WHC-CM-1-6
IV.4.c.(2)	This requirement shall not necessarily apply to structures scheduled for demolition or to buried foundations.	
IV.4.c.(3)	External gamma radiation levels on open lands shall also comply with the basic limit and ALARA process, considering appropriate-use scenarios for the area.	WHC-CM-7-5
IV.4.e.	Residual concentrations of radionuclides in air and water shall be controlled to the required levels shown in paragraph II.1a and as required by other applicable Federal and/or State laws.	WHC-CM-7-5
IV.5.a.(1)	The authorized limits for each property shall be set equal to the generic or derived guidelines unless it can be established, on the basis of specific property data (including health, safety, practical, programmatic and socioeconomic considerations), that the guidelines are not appropriate for use at the specific property.	
IV.5.a.(2)	The authorized limits shall be established to (1) provide that, at a minimum, the basic dose limits of in paragraph IV.3, will not exceeded under the "worst-case" or "plausible-use" scenarios, consistent with the procedures and guidance provided in DOE/CH-8901, or (2) be consistent with applicable generic guidelines.	
IV.5.a.(3)	The authorized limits shall be consistent with limits and guidelines established by other applicable Federal and State laws.	WHC-CM-7-5
IV.6.	Residual radioactive material above the guidelines shall be managed in accordance with Chapter II and the following requirements.	WHC-CM-7-5

Criteria	DOE Order 5400.5, "DOE Radiation Protection of the Public and the Environment"	Mandatory
IV.6.a.(1)	The operational and control requirements specified in the following Orders shall apply to interim storage, interim management, and long-term management. DOE 5000.3, Unusual Occurrence Reporting System	See DOE 5000.3A
IV.6.a.(2)	The operational and control requirements specified in the following Orders shall apply to interim storage, interim management, and long-term management. DOE 5440.1C, Implementation of the National Environmental Policy Act	WMC-CM-7-5
IV.6.a.(3)	The operational and control requirements specified in the following Orders shall apply to interim storage, interim management, and long-term management. DOE 5480.4, Environmental Protection, Safety, and Health Protection Standards	See DOE 5480.4
IV.6.a.(4)	The operational and control requirements specified in the following Orders shall apply to interim storage, interim management, and long-term management. DOE 5482.1B, Environmental, Safety, and Health Appraisal Program	
IV.6.a.(5)	The operational and control requirements specified in the following Orders shall apply to interim storage, interim management, and long-term management. DOE 5483.1A, Occupational Safety and Health Program for DOE Employees at Government-Owned, Contractor-Operated Facilities	See DOE 5483.1A
IV.6.a.(6)	The operational and control requirements specified in the following Orders shall apply to interim storage, interim management, and long-term management. DOE 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements	See DOE 5484.1
IV.6.a.(7)	The operational and control requirements specified in the following Orders shall apply to interim management, and long-term management. DOE 5820.A, Radioactive Waste Management.	See DOE 5820.2A
IV.6.b.(1)	Control and stabilization features shall be designed to provide, to the extent reasonably achievable, an effective life of 50 years with minimum life of at least 25 years.	
IV.6.b.(2)(a)	Controls shall be designed such that Rn-222 concentrations in the atmosphere above facility surfaces or openings in addition to background levels, will not exceed: 100 pCi/L at any given point;	
IV.6.b.(2)(b)	Controls shall be designed such that Rn-222 concentrations in the atmosphere above facility surfaces or openings in addition to background levels, will not exceed: An annual average concentration of 30 pCi/L over the facility site; and	
IV.6.b.(2)(c)	Controls shall be designed such that Rn-222 concentrations in the atmosphere above facility surfaces or openings in addition to background levels, will not exceed: An annual average concentration of 3 pCi/L at or above any location outside the facility site;	
IV.6.b.(2)(d)	Controls shall be designed such that Rn-222 concentrations in the atmosphere above facility surfaces or openings in additions to background levels, will not exceed: Flux rates from the storage of radon producing wastes shall not exceed 20 pCi/sq. m-sec., as required by 40 CFR Part 61.	
IV.6.b.(3)	Controls shall be designed such that concentrations of radionuclides in the groundwater and quantities of residual radioactive material will not exceed applicable Federal or State standards.	WMC-CM-7-5

Criteria	DOE Order 5400.5, "DOE Radiation Protection of the Public and the Environment"	Mandatory
IV.6.d.(1)(a)	Control and stabilization features shall be designed to provide, to the extent reasonably achievable, an effective life of 1,000 years with a minimum life of at least 200 years.	
IV.6.d.(1)(b)[1]	Control and stabilization features shall be designed to limit Rn-222 emanation to the atmosphere from the wastes to less than an annual average release rate of 20 pCi/square meters/s and prevent increases in the annual average Rn-222 concentration at or above any location outside the boundary of the contaminated area by more than 0.5 pCi/L.	
IV.6.d.(1)(b)[2]	Field verification of emanation rates shall be in accordance with the requirements of 40 CFR Part 61.	WHC-CM-7-5
IV.6.d.(1)(d)	Ground water shall be protected in accordance with legally applicable Federal and State standards.	WHC-CM-7-5
IV.6.d.(2)	Long-term management of other radionuclides shall be in accordance with Chapters II, III, and IV of DOE 5820.2A, as applicable.	See DOE 5820.2A
IV.7.a. [1]	Any supplemental limits shall achieve the basic dose limits set forth in Chapter II of this Order for both current and potential unrestricted uses of a property.	WHC-CM-7-5

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DOE Order 5480.5, Safety of Nuclear Facilities

The following Reference(s) have been cited in the attached DOE Order 5480.5, "Safety of Nuclear Facilities", Compliance Assessments.

WHC-CM-1-1, *Management Policies*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-1, *Emergency Plan*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-3, *Industrial Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-9, *Radiological Design*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-10, *Radiation Protection*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-14, *Health Physics Administrative Guide*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-29, *Nuclear Criticality Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-41, *Fire Protection Program Manual*, Westinghouse Hanford, Richland, Washington.

WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-6-1, *Standard Engineering Practices*, Westinghouse Hanford Company, Richland, Washington.

WHC-IP-0860, *Nuclear Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5480.5, "Safety of Nuclear Facilities"	Mandatory
8.a.[1]	The environment, safety, and health program for nuclear facilities shall include the following: A safety analysis and review process which includes a formal documented system for the identification and control of risks through preparation, independent review, and approval of safety analyses	WHC-CM-4-46
8.a.[2]	The environment, safety, and health program for nuclear facilities shall include the following: The requirements of DOE 5481.1B shall be applied	WHC-CM-4-46
8.a.[3]	The environment, safety, and health program for nuclear facilities shall include the following: In addition, new safety analysis reports prepared for nuclear facilities shall follow appropriate Nuclear Regulatory Commission Regulatory Guides on standard format and content of safety analysis reports	WHC-CM-4-46
8.b.	The environment, safety, and health program for nuclear facilities shall include the following: Administrative and procedural controls that delineate (1) clear lines of responsibility and methods for safe operation under normal and emergency conditions, and (2) a system of configuration control that requires independent safety review and approval of all changes to components, equipment, procedures, and systems required for facility safety	WHC-CM-1-3
8.c.	The environment, safety, and health program for nuclear facilities shall include the following: A documented training program for personnel involved in operating nuclear facilities which meets the requirements specified in paragraph 10	WHC-CM-1-3
8.d.[1]	The environment, safety, and health program for nuclear facilities shall include the following: Operational Safety Requirements setting forth the approved limitations of safe operation	WHC-CM-4-46
8.d.[2]	The environment, safety, and health program for nuclear facilities shall include the following: The requirements shall be concise and commensurate with the potential risks involved	WHC-CM-4-46
8.e.	The environment, safety, and health program for nuclear facilities shall include the following: A quality assurance program in accordance with DOE 5700.6B	N/A
8.f.[1]	The environment, safety, and health program for nuclear facilities shall include the following: Application of ES&H codes, standards, and guides covering siting, design, construction, modification, operation, maintenance, deactivation, decontamination, and decommissioning	WHC-CM-1-3
8.f.[2]	The environment, safety, and health program for nuclear facilities shall include the following: Where established standards are determined to be inadequate or unavailable, suitable operating standards shall be developed, using contractor expertise as necessary, so that a defined and agreed upon basis for conducting and assessing operations is established and used	WHC-CM-6-1
8.f.[3]	The environment, safety, and health program for nuclear facilities shall include the following: The safety analysis or other design documentation shall identify, on a facility-specific basis, the standards applied	WHC-CM-4-46
8.g.	The environment, safety, and health program for nuclear facilities shall include the following: Notification investigation, and reporting of occurrences and utilization of a followup system to assure remedial action has been implemented. (See DOE 5484.1 and DOE 5000.3)	N/A

Criteria	DOE Order 5480.5, "Safety of Nuclear Facilities"	Mandatory
8.h.	The environment, safety, and health program for nuclear facilities shall include the following: For new nuclear facilities and for significant modifications to existing nuclear facilities, review of safety analyses design criteria, environmental assessments and environmental impact statements, and other design documents to assure adequate ES&H consideration	WHC-CM-1-3
8.i.	The environment, safety, and health program for nuclear facilities shall include the following: For new nuclear facilities and for significant modifications to existing nuclear facilities, reviews and inspections during construction, acceptance of systems, and preoperational phases to assure compliance with the appropriate ES&H standards and requirements	WHC-CM-1-3
8.j.	The environment, safety, and health program for nuclear facilities shall include the following: A formal documented system for the control and traceability of records and documentation specified herein	WHC-CM-1-3
8.k.	The environment, safety, and health program for nuclear facilities shall include the following: Emergency plans to handle potential accidents in accordance with DOE 5500.2, 5500.3, and DOE 5500.4 including appropriate medical response to radiation incidents	N/A
8.l.	The environment, safety, and health program for nuclear facilities shall include the following: A program of nuclear criticality safety which meets the requirements of paragraphs 11 and 12	WHC-CM-4-29
8.m.	The environment, safety, and health program for nuclear facilities shall include the following: A contractor independent safety review and appraisal system which meets the requirements of paragraph 9	WHC-CM-1-3
8.n.	The environment, safety, and health program for nuclear facilities shall include the following: The safe storage criteria for unirradiated fissionable material meeting the requirements of paragraph 13	WHC-CM-4-29
9.a.	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Functions primarily in an advisory capacity to the line organization, reporting to a designated official at a level of management sufficiently high to take any necessary corrective action	WHC-IP-0860
9.b.	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Is clearly defined and delineated in writing..	WHC-IP-0860
9.c.[1]	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Can be audited by contractor management and by DOE	WHC-IP-0860
9.c.[2]	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: The performance of the system shall be recorded in sufficient detail to permit contractor management and DOE to evaluate its effectiveness	WHC-IP-0860
9.c.[3]	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Actions taken on any recommendations resulting from reviews, audits, inspections, appraisals, and surveillance shall be included in these records	WHC-IP-0860
9.d.[1]	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Provides technical competence in the areas being reviewed	WHC-IP-0860

Criteria	DOE Order 5480.5, "Safety of Nuclear Facilities"	Mandatory
9.d.[2]	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Each review, except that described in subparagraph 9i, below, shall be carried out by persons whose technical disciplines cover the range of technical fields encountered in performing a safety review	WHC-IP-0860
9.d.[3]	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Safety considerations are to be treated in the breadth and depth necessary to identify potential hazards and to evaluate the risks	WHC-IP-0860
9.e.	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Provides for group discussions between reviewers on all but the more routine matters	WHC-CM-1-1
9.f.	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Provides an independent determination of whether a proposed activity involves an unreviewed safety question, violation of a Criticality Safety Limit, Operational Safety Requirement, or any matter for which approval is required	WHC-CM-1-3
9.g.[1]	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Provides an appraisal of the overall operation of each facility at least annually	WHC-CM-1-3
9.g.[2]	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: The majority of the individuals performing the appraisal shall be independent of the operation being appraised	WHC-IP-0860
9.g.[3]	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: it shall include, but not be limited to, applicable areas listed in subparagraph 9h, below	WHC-IP-0860
9.h.(1)	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Provides for objective and independent review of: Proposed modifications to nuclear facilities and equipment having safety significance, and safety analyses thereof	WHC-IP-0860
9.h.(2)	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Proposed experiments and operations having safety significance	WHC-IP-0860
9.h.(3)	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Administrative, operating (normal and abnormal), maintenance, repair, testing, quality assurance, and emergency procedures and significant changes thereto	WHC-IP-0860
9.h.(4)	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Organization and staffing	WHC-IP-0860
9.h.(5)	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Standards, Nuclear Criticality Safety Limits, Operational Safety Requirements, and changes thereto	WHC-IP-0860

Criteria	DOE Order 5480.5, "Safety of Nuclear Facilities"	Mandatory
9.h.(6)	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Nuclear facility safety training programs, including the initial and subsequent qualification and verification requirements and procedures for criticality safety	WHC-IP-0860
9.h.(7)	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Unusual occurrences, including those referred to as incidents, operating anomalies, and violations of Nuclear Criticality Safety Limits or Operational Safety Requirements.	WHC-IP-0860
9.h.(8)	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: The physical condition of the nuclear facilities	WHC-IP-0860
9.h.(9)	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: The accuracy and completeness of recordkeeping and documentation	WHC-IP-0860
9.h.(10)	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Facility operations against its safety analyses	WHC-IP-0860
9.h.(11)	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Facility operational compliance with the requirements of this Order	WHC-IP-0860
9.i.	Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which: Is reviewed by contractor management for adequacy of performance at least every 3 years	WHC-CM-1-3
11.	The following basic elements of nuclear criticality safety shall be provided in contractors' programs involving significant quantities of fissionable materials:	WHC-CM-4-29
11.a.[1]	Process Analysis. Before beginning an operation involving significant quantities of fissionable materials, or changing an existing operation, an operational readiness review shall be made to determine that the entire process will be subcritical under both normal and abnormal operating conditions that could reasonably be expected to occur	WHC-CM-4-29
11.a.[2]	Distinction may be made between shielded and unshielded facilities, and the criteria may be less stringent when adequate shielding assures the protection of personnel	
11.b.[1]	The basis for establishing subcriticality shall be noted for all significant conditions at each step in the process	WHC-CM-4-29
11.b.[2]	In the case of established facilities or operations, this may consist of references to existing nuclear criticality safety evaluations.	
11.c.[1]	Operations shall be governed by written plans and procedures	WHC-CM-4-29
11.c.[2]	These plans and procedures shall be an integral part of the initial proposal for the nuclear facility, its operations, and subsequent modifications that may affect the nuclear reactivity	WHC-CM-4-29

Criteria	DOE Order 5480.5, "Safety of Nuclear Facilities"	Mandatory
11.c.(1)(a)	The plans and procedures shall include the following, where applicable: Plans for receiving fissionable material into the facility and for inspecting the shipment on receipt, including procedures for: Determining, verifying, or noting the contents of each package, including the net weight of fissionable material therein;	WHC-CM-4-29
11.c.(1)(b)	The plans and procedures shall include the following, where applicable: Plans for receiving fissionable material into the facility and for inspecting the shipment on receipt, including procedures for: Placing materials in the receiving area and the storage facility; and	WHC-CM-4-29
11.c.(1)(c)	The plans and procedures shall include the following, where applicable: Plans for receiving fissionable material into the facility and for inspecting the shipment on receipt, including procedures for: Handling wet or damaged packages	WHC-CM-4-29
11.c.(2)(a)	The plans and procedures shall include the following, where applicable: Plans and procedures for storing fissionable material, including: Limitations on total quantity of material, quantity of each individual unit, container dimensions, and spacing between units	WHC-CM-4-29
11.c.(2)(b)	The plans and procedures shall include the following, where applicable: Plans and procedures for storing fissionable material, including: Description of containers in which fissionable materials are stored	WHC-CM-4-29
11.c.(2)(c)	The plans and procedures shall include the following, where applicable: Plans and procedures for storing fissionable material, including: Description of the storage facility, including dimension and materials used in construction of the enclosure and shelving, cubicles, cages, and other equipment within the storage area.	WHC-CM-4-29
11.c.(2)(d)	The plans and procedures shall include the following, where applicable: Plans and procedures for storing fissionable material, including: Precautions to avoid entry of water or other material into a storage area where moderating and reflecting effects would be unsafe	WHC-CM-4-29
11.c.(2)(e)	The plans and procedures shall include the following, where applicable: Plans and procedures for storing fissionable material, including: Administrative controls over the distribution of fissionable material from storage and its return to storage, including means of verifying the weight, isotopic content, chemical composition, and degree of moderation	WHC-CM-4-29
11.c.(3)(a)	The plans and procedures shall include the following, where applicable: Plans and procedures for processing the fissionable material, including: A description, using appropriate sketches or drawings, of equipment and facilities in which the hazard of criticality permit evaluation of the information mentioned in subparagraphs 11c(3)(c) and (f), below	WHC-CM-4-29
11.c.(3)(b)	The plans and procedures shall include the following, where applicable: Plans and procedures for processing the fissionable material, including: A statement of the chemical and physical form of fissionable material in each step of the operation, including isotopic content, the nature of any material, and the resulting concentrations, densities, and degrees of moderation throughout the steps of the process	WHC-CM-4-29
11.c.(3)(c)	The plans and procedures shall include the following, where applicable: plans and procedures for processing the fissionable material, including: A statement of the maximum quantities of fissionable material allowed at any one time in each step of the process	WHC-CM-4-29

Criteria	DOE Order 5480.5, "Safety of Nuclear Facilities"	Mandatory
11.c.(3)(d)	The plans and procedures shall include the following, where applicable: Plans and procedures for processing the fissionable material, including: Spacing of masses of fissionable material within each process area, and separation from fissionable material in adjoining areas	WHC-CM-4-29
11.c.(3)(e)	The plans and procedures shall include the following, where applicable: Plans and procedures for processing the fissionable material, including: Methods of collecting, handling, and transporting fissionable material from each process area or individual operation, and evaluation of the nuclear safety of these methods	WHC-CM-4-29
11.c.(3)(f)	The plans and procedures shall include the following, where applicable: Plans and procedures for processing the fissionable material, including: Description of procedures which are intended to prevent criticality resulting from accumulation of fissionable material in scrap or waste, lathe turnings, crucible slag, pickling solutions, choppings, sumps, or filters	WHC-CM-4-29
11.c.(3)(g)[1]	The plans and procedures shall include the following, where applicable: Plans and procedures for processing the fissionable material, including: Installed or proposed criticality alarm system and emergency procedures, including alarm levels, fail safe features, response time of devices, and frequency of evacuation drills	WHC-CM-4-29
11.c.(3)(g)[2]	Plans and procedures for processing the fissionable material, including: Pertinent documents shall show the location of all detectors, their distance to possible sources of criticality, and intervening shielding	WHC-CM-4-29
11.c.(3)(g)[3]	Plans and procedures for processing the fissionable material, including: The criticality alarm system shall be installed in all locations wherein the quantities of fissionable material may exceed 700 grams of uranium-235, 520 grams of uranium-233, 450 grams of plutonium, or 450 grams of any combination of these three nuclides	WHC-CM-4-29
11.c.(3)(g)[4]	Plans and procedures for processing the fissionable material, including: Limits for other fissionable materials are as indicated in ANSI/ANS 8.15 1981, "American National Standards for Nuclear Criticality Control of Special Actinide Elements."	WHC-CM-4-29
11.c.(3)(g)[6]	Plans and procedures for processing the fissionable material, including: This justification must be based upon a documented analysis demonstrating that, in such cases, the alarm system is not required	WHC-CM-4-29
11.c.(3)(g)[7]	Plans and procedures for processing the fissionable material, including: Special attention shall be given to all processes in which reflectors and moderators more effective than hydrogen are present and, as appropriate, the above limits reduced so that nuclear reactivity is not increased	WHC-CM-4-29
11.c.(3)(h)[1]	Plans and procedures for processing the fissionable material, including: A monitoring system, using gamma- or neutron-sensitive radiation detectors which will initiate a clearly audible alarm, distinctive in tone, if accidental criticality occurs, is required	WHC-CM-4-29
11.c.(3)(h)[2]	Plans and procedures for processing the fissionable material, including: The detectors shall be capable of detecting a criticality condition that produces an absorbed dose in free air of 20 rads of combined neutron and gamma radiation at an unshielded distance of 2 meters from the fissionable material within 60 seconds.	WHC-CM-4-29
11.c.(3)(h)[3]	Plans and procedures for processing the fissionable material, including: Provisions shall be made to minimize false alarms	WHC-CM-4-29

Criteria	DOE Order 5480.5, "Safety of Nuclear Facilities"	Mandatory
11.c.(3)(h)[5]	Plans and procedures for processing the fissionable material, including: In redundant systems, failure of any single channel shall be into the trip state	N/A
11.c.(3)(h)[6]	Plans and procedures for processing the fissionable material, including: Warning of malfunctions within the alarm system without activation of the alarm shall be provided	WHC-CM-4-29
11.c.(3)(h)[7]	Plans and procedures for processing the fissionable material, including: Evacuation for such warning may not be required	
11.c.(3)(h)[8]	Plans and procedures for processing the fissionable material, including: ...such alarm systems are not required for material during shipment or material packaged in approved shipping containers awaiting transport, provided no other operation involving fissionable material not so packaged is permitted on the dock or in the shipment area	
11.c.(3)(h)[9]	Plans and procedures for processing the fissionable material, including: Such an area or dock shall be located so that the interaction between fissionable material is essentially zero	WHC-CM-4-29
11.c.(3)(i)	Plans and procedures for processing the fissionable material, including: Where the function of the facility is to store radioactive waste packaged elsewhere, the plans and procedures required in subparagraph 11c(3), may be appropriately combined with those required for storage in subparagraph 11c(2)	
11.c.(3)(j)	Plans and procedures for processing the fissionable material, including: The plans described in subparagraphs 11c(1) and (2) may make suitable allowance for situations where fissionable contents are repetitive or known from the work of others..	
11.d	Operations shall provide for control, signoff, and traceability of records, such as plans, procedures, inspections, and monitoring systems, regarding the collection, handling, transportation, inspection, receipt and monitoring of fissionable material	WHC-CM-4-29
12.[1]	Nuclear criticality safety of fissionable materials may be provided by maintaining any one of the single parameter limits set forth in the latest revision of ANSI/ANS-8.1-1983.	
12.[2]	Although the single parameter limits are adequate for many purposes they are inconveniently and uneconomically small for many others	
12.[3]	In many cases, simultaneous limitation of two or more parameters may allow more flexible operational control	
12.[4]	General guidance for multiparameter limits may be found in subparagraphs 4d, 14d, 14f, and paragraph 8 of this Order	
12.a.(1)	The following basic control parameters for nuclear criticality safety shall be considered: Controlling Factors. Nuclear criticality safety is achieved by exercising control over: The Mass and Distribution of All Fissionable Materials	WHC-CM-4-29
12.a.(1)(a)[1]	For operations where nuclear criticality safety depends upon mass control, the allowable mass shall be no greater than the safe mass for the associated conditions.	WHC-CM-4-29
12.a.(1)(a)[2]	The safe mass in all cases shall be based upon current published or available nuclear safety guides and handbooks	WHC-CM-4-29

Criteria	DOE Order 5480.5, "Safety of Nuclear Facilities"	Mandatory
12.a.(1)(a)[3]	For operations depending upon mass control where the contained volume does not automatically limit the contents to the safe mass or less, the possibility of multiple batching shall be considered	WHC-CM-4-29
12.a.(1)(a)[4]	If a batch of fissionable materials consists of different physical and chemical forms of a particular isotope, the safe mass for the most reactive combinations under the associated conditions shall be the governing criterion	WHC-CM-4-29
12.a.(1)(a)[5]	If a batch of fissionable material consists of a mixture of fissionable nuclides, the allowable safe mass shall be determined experimentally or determined from calculations made by a method shown to be valid by comparison with experimental data	WHC-CM-4-29
12.a.(1)(b)[1]	Density is an accepted parameter for control of nuclear criticality safety	
12.a.(1)(b)[2]	Systems that use density control shall meet established density criteria	WHC-CM-4-29
12.a.(1)(c)[1]	Individual items of equipment and containers holding fissionable materials, when arranged in a group, in storage, or when being transferred within a nuclear facility or between facilities onsite, shall be spaced so that the entire array is subcritical for all conditions that affect or might affect the nuclear facility or site	WHC-CM-4-29
12.a.(1)(c)[2]	Movement of material under credible in-plant and onsite accident conditions shall be considered	WHC-CM-4-29
12.a.(2)	The following basic control parameters for nuclear criticality safety shall be considered: Controlling Factors. Nuclear criticality safety is achieved by exercising control over: The Mass, Distribution, and Use of the Nuclear Properties of All Other Materials With Which Fissionable Elements are Associated	WHC-CM-4-29
12.a.(2)(a)[1]	Neutron absorbing materials, such as cadmium and boron, may be used to make equipment and processes safe, provided available data confirm their suitability and assure their presence and reliability	
12.a.(2)(b)[1]	For operations in which nuclear criticality safety depends upon control of neutron moderation, there shall be assurance that the prescribed extent of moderation remains unchanged or that, if it does change, the reactivity of the system remains below acceptable subcritical limits	WHC-CM-4-29
12.a.(2)(b)[2]	Such assurance shall include consideration of all credible accidents involving any moderator or combination of moderators	WHC-CM-4-29
12.a.(2)(c)[1]	Neutron reflection shall be considered for all systems of fissionable material	WHC-CM-4-29
12.a.(2)(c)[2]	The extent of reflection shall be based upon the actual reflectors present or those to be expected during normal operations or as a result of a credible accident	WHC-CM-4-29
12.b.	The following basic control parameters for nuclear criticality safety shall be considered: Double Contingency Principle. Process designs shall incorporate sufficient safety factors so that at least two unlikely, independent, and concurrent changes in process conditions must occur before an accidental nuclear criticality is possible	WHC-CM-4-29
12.c.[1]	The following basic control parameters for nuclear criticality safety shall be considered: Geometry Control. Where practicable, reliance shall be placed on equipment design in which dimensions are limited, rather than on administrative controls	WHC-CM-4-29

Criteria	DOE Order 5480.5, "Safety of Nuclear Facilities"	Mandatory
12.c.[2]	Full advantage may be taken of any nuclear characteristics of the process materials	
12.c.[3]	Control shall be exercised to maintain all dimensions and nuclear properties on which reliance is placed	WHC-CM-4-29
12.d.[1]	The following basic control parameters for nuclear criticality safety shall be considered: Nuclear Criticality Safety Limits. Limits for nuclear criticality safety shall be established on bases derived from experiments	WHC-CM-4-29
12.d.[2]	In the absence of directly applicable experimental measurements, the limits may be derived from calculations made by a method shown to be valid by comparison with experimental data, provided allowances are made for uncertainties in the data and in the calculations	
12.e.[1]	The following basic control parameters for nuclear criticality safety shall be considered: Margins of Safety. Safety margins used shall meet the control parameter requirements above	WHC-CM-4-29
12.e.[2]	Further, a cumulative margin of safety shall provide allowance for experimental and computational uncertainties	WHC-CM-4-29
12.e.[3]	Procedure violations also shall be a consideration	WHC-CM-4-29
12.f.	The following basic control parameters for nuclear criticality safety shall be considered: Onsite Movement and Offsite Shipment of Fissionable Materials	WHC-CM-4-29
12.f.(1)(a)	For all such movements, the following requirements shall be met: For the onsite movement of fissionable materials that do not present a radiation hazard, the pertinent requirements set forth in this Order shall be met	WHC-CM-4-29
12.f.(1)(b)	For all such movements, the following requirements shall be met: For onsite movement of fissionable materials that presents a radiation hazard, as well as the possibility of an accidental chain reaction, the pertinent requirements of this Order, DOE 5480.3, and DOE 5480.1A, Chapter XI	WHC-CM-4-29
12.f.(1)(c)	For all such movements, the following requirements shall be met: In addition to the physical controls specified above, administrative controls, including traffic controls, shall be exercised as deemed necessary by Heads of Field Organizations to minimize accident probabilities	WHC-CM-4-29
12.f.(1)(d)	For all such movements, the following requirements shall be met: Fire protection, security, health physics, and any other emergency personnel, when deemed appropriate by Heads of Field Organizations, shall be alerted and advised of movements and routings	WHC-CM-4-14
12.f.(2)[1]	Safety standards for the packaging of fissionable materials for any offsite shipment are outlined in DOE 5480.3	WHC-CM-4-29
12.f.(2)[2]	Further, such shipments shall meet the nuclear criticality safety requirements set forth in this Order and the radiological safety standards outlined in DOE 5480.1A, Chapter XI	WHC-CM-4-29
13.b.(1)	Nonessential combustible materials shall not be stored in the storage area	WHC-CM-4-29

Criteria	DOE Order 5480.5, "Safety of Nuclear Facilities"	Mandatory
13.b.(2)[1]	Process operations, storage of nonnuclear materials or equipment which is not directly required for storage operations, and all other functions not directly a part of normal storage operations shall be excluded from the storage area	
13.b.(2)[2]	Deviations from this requirement must be approved by the Head of the Field Organization	WHC-CM-4-29
13.b.(3)	Documented periodic inspections, in situ tests, and preventive maintenance shall be performed at designated frequencies to assure that the safety systems and components necessary for criticality control, fire control, radiation detection, and environmental monitoring, as well as their alarm systems, are being properly maintained in readiness for use	WHC-CM-4-29
13.b.(4)	Limits for criticality safety shall be posted in conspicuous places near the storage area	WHC-CM-4-29
13.b.(5)(a)	Signs or other appropriate devices shall be utilized at strategic locations to provide instructions regarding: Interpretations of, and responses to alarms;	WHC-CM-4-29
13.b.(5)(b)	Signs or other appropriate devices shall be utilized at strategic locations to provide instructions regarding: Evacuation routes; and	WHC-CM-4-29
13.b.(5)(c)	Signs or other appropriate devices shall be utilized at strategic locations to provide instructions regarding: Combatting fires	WHC-CM-4-29
13.b.(6)	In conjunction with site emergency planning, a fire fighting plan shall be developed, incorporated into the overall site fire plan, and exercised through periodic drills which include use of emergency equipment	WHC-CM-4-29 WHC-CM-4-41 WHC-CM-4-1
13.b.(7)	Auxiliary fire fighting equipment, self contained breathing apparatus, and protective clothing shall be provided, as necessary, to facilitate manual fire suppression	WHC-CM-4-29
13.b.(8)	Excess fissionable material shall not be construed to be "In-Process" to circumvent the requirements of this paragraph	WHC-CM-4-29
13.b.(10)[1]	All material shall be stored in racks or equivalent equipment capable of securely locating stored material to prevent displacement, to assure spacing control, and to meet designs for safety under operational and credible accident conditions	WHC-CM-4-29
13.b.(10)[2]	Floor storage within the storage facility will be permitted only where control of location and other safety requirements (equivalent to those of racks) are inherently provided by the individual containers and their restraints	WHC-CM-4-29
13.b.(11)[1]	All pyrophoric materials shall be put in a safe form prior to storage or stored in approved containers that will not permit spontaneous ignition or dispersal	WHC-CM-4-3
13.b.(11)[2]	Other dispersible materials must be stored in approved storage containers	WHC-CM-4-29
13.b.(12)[1]	All containers shall be marked or coded to indicate the type or category of material, amount, degree of enrichment, and the radiation level at the outside surface of the vessel	WHC-CM-4-29

Criteria	DOE Order 5480.5, "Safety of Nuclear Facilities"	Mandatory
13.b.(12)[2]	Containers shall be securely closed and positioned so as to prevent significant displacement and maintain criticality prevention requirements	WHC-CM-4-29
13.b.(13)[1]	Container design shall be appropriate to the form of stored material	WHC-CM-4-29
13.b.(13)[2]	Criteria for container integrity shall be developed in the course of the required safety analysis and the application of these criteria ascertained by periodic inspection	WHC-CM-4-29
13.b.(13)[4]	Such venting must not permit spread of contamination	WHC-CM-4-10
13.b.(14)[1]	Plutonium or U-233 bearing or contaminated material shall be packaged in a closed metal container	WHC-CM-4-29
13.b.(14)[2]	Combustibles within the container shall be minimized	WHC-CM-4-29
13.b.(15)[1]	Plutonium storage facilities and containers shall be monitored and checked periodically to assure continued integrity of containment	WHC-CM-4-29
13.b.(15)[2]	When required by the form or hazard potential of the stored material, procedures shall be developed to detect contamination or loss of primary containment upon entering the plutonium storage facility	WHC-CM-4-9
13.b.(16)	Plutonium containers in which gas buildup can occur shall be designed to prevent leakage of gas over the maximum storage period or vented to prevent an accumulation of explosive gases; however, such venting must not permit spread of contamination	WHC-CM-4-10
13.b.(17)[1]	Criteria, such as external and internal corrosion rate for determining suitability of the plutonium containers, shall be developed and set forth in writing	
13.b.(17)[2]	All containers shall be periodically inspected against the criteria developed	
13.b.(17)[3]	The time between inspections may vary depending upon container quality and type	
13.b.(18)	Provisions shall be made in a plutonium storage facility to assure necessary and adequate heat removal for plutonium containers as established by the safety assessment.	
13.c.[1]	Multipurpose Facility (Storage and Processing) Criteria. In making the safety assessment for any building or area which includes both storage and processing functions, the operating contractor shall with the approval of the Head of the Field Organization, specify which manufacturing, production, or laboratory materials may be termed "in-process" and which may not	
13.c.[2]	Materials in excess of in-process requirements shall be promptly placed in approved storage facilities	
13.c.[3]	Definitions of in-process materials shall be established and approved prior to the start of the related operations and maintained thereafter unless approved changes are effected	
13.d.	Facility Functional Design Requirements for Storage. The design criteria shall meet the requirements of DOE 6430.1, GENERAL DESIGN CRITERIA, Chapter XXI, "Plutonium Facilities," and Chapter XXIII, "Unirradiated Enriched Uranium Storage Facilities."	

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DOE Order 5480.7A, Fire Protection

The following Reference(s) have been cited in the attached DOE Order 5480.7A, "Fire Protection," Compliance Assessment.

WHC-CM-1-2, *Organization Charts and Charters*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-41, *Fire Protection Manual*, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5480.7A, "Fire Protection"	Mandatory
8.i.(1)	As required by the PSO or the Heads of Field Organizations and directed by the Contracting Officer, contractors shall be required to: Provide and maintain a level of fire protection to meet the objectives of paragraph 4, and the criteria of paragraph 9.	WHC-CM-4-41
8.i.(2)	As required by the PSO or the Heads of Field Organizations and directed by the Contracting Officer, contractors shall be required to: Provide and maintain a system to ensure that the requirements of the DOE fire protection program are documented and incorporated in the plans and specifications for all new facilities and for major modifications of existing facilities. This includes review and comment by a qualified fire protection engineer of plans, specifications and test procedures and results for fire protection features.	WHC-CM-4-41
8.i.(3)	As required by the PSO or the Heads of Field Organizations and directed by the Contracting Officer, contractors shall be required to: Assist DOE in coordinating fire safety assessments at those facilities included in the survey program, establish action plans for compliance with recommendations resulting from the assessments, and forward compliance plans, exemption requests, and other requested data to DOE field organizations.	WHC-CM-4-41
8.i.(4)	As required by the PSO or the Heads of Field Organizations and directed by the Contracting Officer, contractors shall be required to: Establish and maintain a list of facilities for which the contractor has fire protection assessment responsibility.	WHC-CM-4-41
8.i.(5)	As required by the PSO or the Heads of Field Organizations and directed by the Contracting Officer, contractors shall be required to: Conduct fire protection assessments of facilities according to the scope and frequency established by this Order.	WHC-CM-4-41
8.i.(6)	As required by the PSO or the Heads of Field Organizations and directed by the Contracting Officer, contractors shall be required to: Provide fire protection technical assistance to DOE.	WHC-CM-1-2
8.i.(7)	As required by the PSO or the Heads of Field Organizations and directed by the Contracting Officer, contractors shall be required to: Submit requests for exemptions and fire safety equivalencies to the Head of the Field Organization for those facilities where compliance with specific program elements is not attainable and where an acceptable level of safety has been achieved.	WHC-CM-4-41
8.i.(8)[1]	As required by the PSO or the Heads of Field Organizations and directed by the Contracting Officer, contractors shall be required to: Maintain or have access to an adequate fire protection staff, including a qualified fire protection engineer(s).	WHC-CM-4-41
9.[1]	A DOE facility shall be characterized by a level of fire protection sufficient to fulfill the requirements for the best protected class of industrial risks (Highly Protected Risk/Improved Risk).	WHC-CM-4-41
9.[2]	...the DOE Fire Protection Program shall meet or exceed the minimum requirements established by the National Fire Protection Association as directed by the PSO.	WHC-CM-4-41
9.[3]	Basic requirements shall include: a reliable water supply of acceptable capacity for fire suppression; noncombustible construction of an acceptable nature for the occupancy of the facility; automatic fire extinguishing systems; a fully staffed, trained, and equipped emergency response force; a means to summon the emergency response force in the event of a fire; and a means to notify and evacuate building occupants in the event of a fire.	WHC-CM-4-41

Criteria	DOE Order 5480.7A, "Fire Protection"	Mandatory
9.[4]	For areas subject to significant life safety risks, serious property damage, program interruption, or loss of safety class equipment as defined in the relevant facility SAR, additional protection measures may be deemed necessary as determined by the AHJ.	N/A
9.a.(1)(a)	Fire protection programs shall incorporate the following elements to assure that the objectives of paragraph 4 are met: Fire Protection Criteria. A documented "Fire Protection Program" which includes: A statement of management commitment to achieve the above stated objectives.	WHC-CM-4-41
9.a.(1)(b)	Fire protection programs shall incorporate the following elements to assure that the objectives of paragraph 4 are met: Fire Protection Criteria. A documented "Fire Protection Program" which includes: A policy statement that implements this Order and other DOE fire protection related mandatory codes and standards.	WHC-CM-4-41
9.a.(1)(c)	Fire protection programs shall incorporate the following elements to assure that the objectives of paragraph 4 are met: Fire Protection Criteria. A documented "Fire Protection Program" which includes: Fire protection criteria that reflect site-specific aspects of the fire protection program, including: the organization and responsibilities of the fire protection staff, administrative aspects of the fire protection program, and requirements for physical fire protection features.	WHC-CM-4-41
9.a.(2)(a)	Fire protection programs shall incorporate the following elements to assure the objectives of paragraph 4 are met: Assessments. Documented evaluations of the fire protection program, including field walkdowns of facilities, shall be performed as follows: Facilities/contractors shall be assessed to establish that they conform with DOE fire protection criteria.	WHC-CM-4-41
9.a.(2)(b)[4]	Documented evaluations of the fire protection program, including field walkdowns of facilities, shall be performed as follows: Minimum Frequency Contractors/Facility Managers: Annual fire protection assessments shall be made of facilities valued in excess of \$50 million; where considered to be a moderate (Category 2 Hazard) or high hazard (Category 1 Hazard) as defined in DOE 5481.1B, SAFETY ANALYSIS AND REVIEW SYSTEM, for nonnuclear facilities and in DOE 5480.23, NUCLEAR SAFETY ANALYSIS REPORTS, for nuclear facilities; or in which vital programs are involved.	WHC Fire Protection IP:07
9.a.(2)(b)[5]	Documented evaluations of the fire protection program, including field walkdowns of facilities, shall be performed as follows: Minimum Frequency Contractors/Facility Managers: Fire protection assessments shall be made at least every two years of facilities plus equipment valued at \$10 million to \$50 million.	WHC Fire Protection IP:07
9.a.(2)(b)[6]	Documented evaluations of the fire protection program, including field walkdowns of facilities, shall be performed as follows: Minimum Frequency Contractors/Facility Managers: Remaining facilities shall be assessed at least every three years or at frequencies determined by the AHJ.	WHC Fire Protection IP:07
9.a.(2)(b)[7]	Documented evaluations of the fire protection program, including field walkdowns of facilities, shall be performed as follows: Minimum Frequency Contractors/Facility Managers: Comprehensive assessments of fire protection program elements shall be made every two years.	WHC-CM-4-41
9.a.(2)(b)[8]	Documented evaluations of the fire protection program, including field walkdowns of facilities, shall be performed as follows: Minimum Frequency Contractors/Facility Managers: Copies of the two most recent assessment reports shall be kept on file.	WHC Fire Protection IP:07, IP:08

Criteria	DOE Order 5480.7A, "Fire Protection"	Mandatory
9.a.(2)(c)[1]	Assessments shall include an evaluation of the following elements of the fire protection program: Program-related: Comprehensiveness of the fire protection program; Procedures for engineering design and review; Procedures for maintenance, testing, and inspection; Fire protection engineering staff (number, qualifications, training); Fire suppression organization (personnel and training); Fire suppression mutual aid agreements; Management support; Exemptions and documented equivalencies.	WHC Fire Protection IP:08
9.a.(2)(c)[2]	Assessments shall include an evaluation of the following elements of the fire protection program: Facility-related: Fire protection of safety class equipment; Life safety considerations; Fire protection of vital programs; Fire protection of high value property; Fire suppression equipment; Water runoff; Pre-fire plans; Fire apparatus accessibility; Completeness of fire hazards analyses; Fire barrier integrity; Completeness of fire loss potential (MPFL/MCFL) determinations; Fire safety training.	WHC Fire Protection IP:07
9.a.(2)(c)[3]	Assessments shall include an evaluation of the following elements of the fire protection program: Combined Aspects (Program & Facility): Inspection, testing, and maintenance reports; Adequacy of facility appraisal reports; Tests of fire suppression systems, water supplies, and procedures for maintaining these in working order; Administrative controls; Temporary protection and compensatory measures; Status of findings from previous assessments; Conformance with applicable Orders, codes and standards.	WHC Fire Protection IP:08
9.a.(3)[1]	Fire protection programs shall incorporate the following elements to assure that the objectives of paragraph 4 are met: Fire Hazards Analyses. A graded FHA, that reflects the risks from fire in a facility, shall be performed for new facilities as directed by DOE 6430.1A, for nuclear facilities where safety analyses are required by DOE 5480.23, and as directed by the PSO.	WHC-CM-4-41
9.a.(3)[2]	A Safety Analysis Report (SAR) that addresses the following elements will satisfy the requirement for an FHA.	
9.a.(3)(a)	A graded FHA shall contain, but not be limited to, the following elements: Description of construction.	WHC-CM-4-41
9.a.(3)(b)	A graded FHA shall contain, but not be limited to, the following elements: Protection of essential safety class equipment.	WHC-CM-4-41
9.a.(3)(c)	A graded FHA shall contain, but not be limited to, the following elements: Fire protection features.	WHC-CM-4-41
9.a.(3)(d)	A graded FHA shall contain, but not be limited to, the following elements: Description of fire hazards.	WHC-CM-4-41
9.a.(3)(e)	A graded FHA shall contain, but not be limited to, the following elements: Life safety considerations.	WHC-CM-4-41
9.a.(3)(f)	A graded FHA shall contain, but not be limited to, the following elements: Critical process equipment.	WHC-CM-4-41
9.a.(3)(g)	A graded FHA shall contain, but not be limited to, the following elements: High value property.	WHC-CM-4-41
9.a.(3)(h)	A graded FHA shall contain, but not be limited to, the following elements: Damage potential: Maximum Credible Fire Loss (MCFL) and Maximum Possible Fire Loss (MPFL).	WHC-CM-4-41

Criteria	DOE Order 5480.7A, "Fire Protection"	Mandatory
9.a.(3)(i)	A graded FHA shall contain, but not be limited to, the following elements: Fire Department/Brigade response.	WHC-CM-4-41
9.a.(3)(j)	A graded FHA shall contain, but not be limited to, the following elements: Recovery potential.	WHC-CM-4-41
9.a.(3)(l)	A graded FHA shall contain, but not be limited to, the following elements: Potential for a toxic, biological and/or radiation incident due to a fire.	WHC-CM-4-41
9.a.(3)(m)	A graded FHA shall contain, but not be limited to, the following elements: Emergency planning.	WHC-CM-4-41
9.a.(3)(n)	A graded FHA shall contain, but not be limited to, the following elements: Security considerations related to fire protection.	WHC-CM-4-41
9.a.(3)(o)	A graded FHA shall contain, but not be limited to, the following elements: Natural hazards (earthquake, flood, wind) impact on fire safety.	WHC-CM-4-41
9.a.(3)(p)	A graded FHA shall contain, but not be limited to, the following elements: Exposure fire potential, including the potential for fire spread between fire areas.	WHC-CM-4-41
9.a.(3)[2]	Fire protection programs shall incorporate the following elements to assure the objectives of paragraph 4 are met: Fire Hazards Analyses. An FHA shall be performed under the direction of a qualified fire protection engineer.	WHC-CM-4-41
9.b.(1)[1]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Safety Class Equipment. In areas where a fire could cause damage to safety class equipment and where no redundant safety capability exists, a redundant fire protection system shall be provided for the safety class equipment.	WHC-CM-4-41
9.b.(1)[2]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Safety Class Equipment. For new facilities, redundant Safety Class Equipment shall located be in separate fire areas.	WHC-CM-4-41
9.b.(1)[3]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Safety Class Equipment. Fire suppression systems shall be designed such that their actuation will not damage safety class equipment or cause a criticality incident.	WHC-CM-4-41
9.b.(2)[1]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Life Safety. Life safety provisions shall be provided for all facilities in accordance with the Life Safety Code (LSC), NFPA Standard 101.	WHC-CM-4-41
9.b.(2)[3]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Life Safety. Exit requirements for toxic and explosive environments shall be as determined by the AHJ.	WHC-CM-4-41
9.b.(2)[4]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Life Safety. ...for explosives environments, exits shall reflect the criteria contained in the DOE Explosives Safety Manual, (DOE/EV 06194).	WHC-CM-4-41

Criteria	DOE Order 5480-7A, "Fire Protection"	Mandatory
9.b.(2)[5]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Life Safety. Where noncompliance with some Life Safety Code provisions may be required for public safety, as in some containment structures, additional protective systems and personnel limits should be maintained.	WHC-CM-4-41
9.b.(2)[6]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Life Safety. Compliance with the Life Safety Code shall be considered to satisfy the exit requirements of the applicable building code and OSHA 29 CFR 1910.	WHC-CM-4-41
9.b.(3)(a)	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Automatic Fire Protection. Complete automatic fire suppression systems designed in accordance with applicable NFPA standards shall be provided as follows: In all new structures over 5,000 square feet.	WHC-CM-4-41
9.b.(3)(b)	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Automatic Fire Protection. Complete automatic fire suppression systems designed in accordance with applicable NFPA standards shall be provided as follows: In all structures having an MPFL in excess of \$1,000,000. or where the maximum credible fire will result in the loss of use of a vital structures for a period longer than that specified as acceptable by the applicable PSO.	WHC-CM-4-41
9.b.(4)	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Redundant Fire Protection.	WHC-CM-4-41
9.b.(5)	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Testing and Maintenance. Fire protection systems shall be tested and maintained in accordance with the applicable NFPA standards and as supplemented by criteria in the DOE Fire Protection Resource Manual.	WHC-CM-4-41
9.b.(6)	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Quality Construction. New permanent structures in excess of 5,000 square feet shall be of noncombustible or fire resistive construction.	WHC-CM-4-41
9.b.(7)[1]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Fire Department. A fully staffed, trained, and equipped fire department/brigade shall service all DOE facilities, except as determined by the PSO.	WHC-CM-4-41
9.b.(8)[1]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Fire Protection Water Supply. An automatic water supply for fire protection having a minimum two hours stored water capacity shall be maintained.	WHC-CM-4-41
9.b.(8)[2]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Fire Protection Water Supply. Facilities having a MPFL in excess of \$50 million shall be provided with an additional, independent source of fire protection water.	WHC-CM-4-41
9.b.(8)[3]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Fire Protection Water Supply. A water supply dedicated for fire protection may be necessary as determined by the PSO.	WHC-CM-4-41

Criteria	DOE Order 5480.7A, "Fire Protection"	Mandatory
9.b.(8)[4]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Fire Protection Water Supply. A dedicated system shall be able to meet hose stream and sprinkler system demands.	WHC-CM-4-41
9.b.(8)[5]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Fire Protection Water Supply. A combined fire and process/domestic system shall be able to deliver the fire demand plus the maximum daily domestic demand for the required duration.	WHC-CM-4-41
9.b.(9)[1]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Underground Piping. Mains shall be sized for the largest fire flows anticipated but in no case shall be less than 8-inch diameter.	WHC-CM-4-41
9.b.(9)[2]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Supply piping to individual fire sprinkler systems shall be at least as large as the fire sprinkler system riser.	WHC-CM-4-41
9.b.(10)[1]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Liquid Run-off Control. Natural or artificial means of controlling liquid run offs from a maximum credible fire shall be provided so that contaminated or polluting liquids will not escape the site, including potentially contaminated water resulting from fire fighting operations.	WHC-CM-4-41
9.b.(10)[2]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Liquid Run-off Control. The amount of fire water that must be controlled and the design of the containment system shall be determined based on consultations with the cognizant DOE fire protection engineer.	WHC-CM-4-41
9.b.(11)	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Fire Alarm Systems. Where fire suppression or fire alarm systems are provided, local alarms in the protected area and alarm transmission to an acceptable remote attended location shall be provided.	WHC-CM-4-41
9.b.(12)	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Containment Systems for Ventilation. Facilities which require ventilation containment systems shall be protected from the effects from fire to preclude release of radioactive, toxic, or other hazardous materials.	WHC-CM-4-41
9.b.(13)[1]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Special Hazard Protection. Hazards unique to DOE and not addressed by the mandatory codes and standards listed in Paragraph 5 shall be protected by isolation, segregation or use of special fire control systems (inert gas, explosion suppression, etc.) as determined by the AHJ.	WHC-CM-4-41
9.b.(13)[2]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Special Hazard Protection. In addition devices for limiting or controlling the effects of a fire...shall be provided.	WHC-CM-4-41
9.b.(14)	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Halon Usage. Future use of Halon will be governed under the conditions set forth in the DOE memorandum "Interim Position on the Installation of New Halon 1301 Fixed Fire Suppression Systems and Halon 1211 Portable Fire Extinguishers," dated September 27, 1990, and superseding documents.	WHC-CM-4-41

Criteria	DOE Order 5480.7A, "Fire Protection"	Mandatory
9.b.(15)	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Seismic Criteria. The design of fire protection systems to withstand seismic events shall be in accordance with the criteria developed by the National Fire Protection Association, except as required by other DOE criteria.	WHC-CM-4-41
9.b.(16)	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Impairment Control. A fire protection system impairment program shall be provided for control of operations and tracking of impairments during periods when fire protection systems are out of service.	WHC-CM-4-41
9.b.(17)[1]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Higher Standard of Protection. A higher standard of protection, which includes fire protection features beyond those stipulated above, may be warranted under certain circumstances.	WHC-CM-4-41
9.b.(17)[2]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Higher Standard of Protection. These features shall be determined by the PSO.	WHC-CM-4-41
9.b.(17)[3]	DOE facilities shall incorporate the following elements to assure that the objectives of paragraph 4, are met: Higher Standard of Protection. The following factors shall be considered: (a) importance (b) effect of production (c) costs versus benefits (d) future conditions	WHC-CM-4-41
9.c.(1)[1]	Fire Prevention Procedures. Facilities shall have procedures governing the use and storage of combustible, flammable, radioactive and hazardous materials so as to minimize the risk from fire.	WHC-CM-4-41
9.c.(1)[2]	Fire Prevention Procedures. Such procedures shall also exist for activities, such as smoking limitations, isolation of hot work, and other fire prevention measures, which contribute to the decrease in fire risk.	WHC-CM-4-41
9.c.(2)[1]	Assessment Results Tracking Program. There shall be a program to identify, prioritize and monitor the status of fire protection related assessment findings/recommendations until resolution is achieved.	WHC-CM-4-41
9.c.(3)	Interim Compensatory Measures. When final resolution of a finding/recommendation will be significantly delayed because of funding, scheduling, or other considerations, appropriate interim compensatory measures (e.g., fire watches, fire patrols, enhanced hazards control procedures, temporary fire protection features) shall be implemented to minimize the fire risk.	WHC-CM-4-41
9.c.(4)[1]	Operability Specifications. Minimum requirements to establish "operability" shall be developed for fire protection features such as: fire doors, fire dampers, fire detection and suppression systems, fire protection water supplies, etc.	WHC-CM-4-41
9.c.(4)[2]	Operability Specifications. Periodic tests, conducted to satisfy the applicable NFPA codes and standards or other DOE criteria shall confirm that these features are operable.	WHC-CM-4-41
9.c.(4)[3]	Operability Specifications. If fire protection will be inoperable for a significant period of time, interim compensatory measures shall be implemented until operability is restored.	WHC-CM-4-41
9.c.(5)[1]	Emergency Planning. Information from the fire protection program shall be incorporated in the Emergency Plan.	WHC-CM-4-41

Criteria	DOE Order 5480.7A, "Fire Protection"	Mandatory
9.c.(5)(2)	Emergency Preparedness. The facility fire protection organization shall be involved in the development of the Emergency Plan and in all related training and drills.	WHC-CM-4-41
9.c.(6)(1)	Training. Training shall be provided for the individuals within the fire protection organization, the fire department/brigade, and any other person with responsibilities for fire safety.	WHC-CM-4-41
9.c.(6)(2)	Training. Training programs shall reflect the criteria contained in the mandatory codes and standards listed in paragraph 5, and shall reflect site-specific considerations.	WHC-CM-4-41
9.c.(7)(1)	Communications. Emergency communications shall be outlined in the emergency plan.	WHC-CM-4-41
9.c.(7)(2)	Communications. The communications capability among potential responders to an emergency shall be coordinated to avoid confusion and interference.	WHC-CM-4-41
9.c.(7)(3)	Communications. This capability shall be tested on a frequency established by the authority having jurisdiction in accordance with DOE criteria.	WHC-CM-4-41

DOE Order 5480.10, Contractor Industrial Hygiene Program

The following Reference(s) have been cited in the attached DOE Order 5480.10, "Contractor Industrial Hygiene Program", Compliance Assessment.

WHC-CM-1-1, *Management Policies*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-2, *Organizations Charts and Charters*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-3, *Industrial Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-40, *Industrial Hygiene Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-7-5, *Environmental Compliance Manual*, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5480.10; "Contractor Industrial Hygiene Program"	Mandatory
9.	The manager of the contractor organization performing the actual work or job-related task shall assure compliance with the requirements of this paragraph.	WHC-CM-1-3
9.a. [1]	Internal directives or operating procedures shall be developed to implement industrial hygiene programs.	WHC-CM-1-1
9.a. [3]	The directives shall clearly specify the authority and responsibilities of the organizational staff administering the industrial hygiene program.	WHC-CM-1-2
9.a. [4]	The directives shall also specify the responsibilities of other functional organizations.	WHC-CM-1-3
9.b. [1]	The industrial hygiene program shall be designed to preserve employee health and well-being.	WHC-CM-4-40
9.b. [2]	This shall be accomplished by identification, evaluation, and control of environmental factors and stresses found in the workplace.	WHC-CM-4-40
9.b. [3]	These environmental factors and stresses include: chemical...; physical...; biological...; and ergonomic....	WHC-CM-4-40
9.b.(1)	The contractor industrial hygiene program must have the following features: Identification of Health Hazards. The industrial hygiene staff shall identify and document existing and potential occupational health hazards through: knowledge and assessment of the operations; periodic walk-through surveys; information provided by interorganizational communication; the review of proposed projects, facilities, engineering plan, and specifications; and maintenance of a hazards inventory or tracking system.	WHC-CM-1-2 WHC-CM-4-40
9.b.(2)[1]	The contractor industrial hygiene program must have the following features: Hazard Evaluation. Once potential health hazards are identified, the industrial hygiene staff must determine the extent of the hazard through appropriate consultation with other professionals, sound judgment, and the application of established standards or guides and such evaluation techniques as air sampling and bioassay.	WHC-CM-1-3
9.b.(2)[2]	The contractor industrial hygiene program must have the following features: A report shall be sent to the first level supervisor with the industrial hygiene staff's evaluation of whether occupational exposures are within permissible limits, together with supporting evidence.	WHC-CM-4-40
9.b.(2)[3]	The contractor industrial hygiene program must have the following features: The permissible exposure limits used in hazard evaluation shall not exceed those in the mandatory industrial hygiene standards of DOE 5480.4, Attachment 2, page 2, paragraph 2d(3).	WHC-CM-4-40
9.b.(3)[1]	The contractor industrial hygiene program must have the following features: Control Measures. Control measures shall be implemented whenever it is determined that a potential health hazard exists sufficient to produce illness or injury or that applicable standards are not being followed.	WHC-CM-4-40
9.b.(3)[2]	The contractor industrial hygiene program must have the following features: The industrial hygiene staff shall formally recommend control measures to the first level supervisor who must respond promptly.	
9.b.(3)[3]	The contractor industrial hygiene program must have the following features: Where feasible, engineering control measures, process change, or material substitution shall be used to prevent or minimize exposure to hazards.	WHC-CM-4-3 WHC-CM-4-40

Criteria	DOE Order 5480.10, "Contractor Industrial Hygiene Program"	Mandatory
9.b.(4)[1]	The contractor industrial hygiene program must have the following features: Periodic Review. The satisfactory control of occupational health hazards shall be given continuing attention despite the imposition of control measures.	WHC-CM-1-2 WHC-CM-4-40
9.b.(4)[2]	The contractor industrial hygiene program must have the following features: The industrial hygiene staff shall determine the type and frequency of periodic monitoring.	WHC-CM-1-2 WHC-CM-4-40
9.b.(4)[3]	The contractor industrial hygiene program must have the following features: The industrial hygiene staff shall report to line management regarding the continuing adequacy of controls, the need for additional controls, or recommendations for maintenance or reemphasis of administrative controls.	WHC-CM-1-2 WHC-CM-4-40
9.b.(4)[4]	The contractor industrial hygiene program must have the following features: Employees of DOE contractor organizations shall be provided the results of the monitoring program for toxic materials or harmful physical agents, upon request.	WHC-CM-4-40
9.b.(5)[1]	The contractor industrial hygiene program must have the following features: Employee Education. The industrial hygiene staff shall assist the first level supervisor in the development of an employee information and training program whenever a potential health hazard exists requiring engineering controls, administrative procedures, or personal protective equipment.	WHC-CM-1-2 WHC-CM-4-40
9.b.(5)[2]	The contractor industrial hygiene program must have the following features: The program shall include written notification of employees of environmental monitoring results when the results indicate that the employees are exposed above permissible limits.	WHC-CM-4-40
9.b.(6)[1]	The contractor industrial hygiene program must have the following features: Medical monitoring. The industrial hygiene staff shall inform the medical organization of potential and existing health hazards identified, the results of hazard evaluations, and other industrial hygiene information needed for operation of a medical monitoring program.	WHC-CM-1-3 WHC-CM-4-40
9.c.(4) [1]	For OSHA-regulated carcinogens, a program shall be implemented that, at a minimum, conforms to the requirements of applicable OSHA standards (refer to DOE 5483.1A).	WHC-CM-4-40
9.c.(4) [2]	Exposure to carcinogen listed in the ACGIH TLV booklet shall be controlled by application of the industrial hygiene functions of identification, evaluation, control, periodic review, employee education, and medical monitoring listed in paragraph 9b, above.	WHC-CM-4-40
9.c.(4)(a)[1]	In addition, the following requirements shall apply to the use and/or potential exposure to carcinogens. Safety plans, standard operating procedures, or experimental protocols shall be written describing the use of chemical carcinogen and the procedures used to control exposure.	WHC-CM-4-40
9.c.(4)(a)[2]	In addition, the following requirements shall apply to the use and/or potential exposure to carcinogens. These documents shall be reviewed and approved by the industrial hygiene staff prior to the initiation of an operation.	WHC-CM-4-40
9.c.(4)(b)[1]	In addition, the following requirements shall apply to the use and/or potential exposure to carcinogens. Regulated areas shall be established where chemical carcinogens are used.	WHC-CM-4-40

Criteria	DOE Order 5480.10, "Contractor Industrial Hygiene Program"	Mandatory
9.c.(4)(b)[2]	In addition, the following requirements shall apply to the use and/or potential exposure to carcinogens. The characteristics of regulated areas shall be appropriate to assure that access is controlled and will depend on the quantity and physical properties of the material being used and on the operations being performed.	WHC-CM-4-40
9.c.(4)(b)[3]	In addition, the following requirements shall apply to the use and/or potential exposure to carcinogens. A record shall be maintained of all personnel working in regulated areas.	WHC-CM-4-40
9.c.(4)(c)[1]	In addition, the following requirements shall apply to the use and/or potential exposure to carcinogens. Engineering controls shall be the primary method used to minimize exposure to carcinogens and to prevent the release of carcinogens into the workroom environment.	WHC-CM-4-40
9.c.(4)(c)[2]	In addition, the following requirements shall apply to the use and/or potential exposure to carcinogens. Provisions shall be made to assure that hazardous levels of contaminated air are not released into adjacent work areas or the outside environment.	WHC-CM-4-40
9.c.(4)(c)[3]	In addition, the following requirements shall apply to the use and/or potential exposure to carcinogens. All contaminated liquid and solid waste shall be disposed utilizing approved methods (refer to DOE 5480.4, Attachment 1, paragraph 2b(11)).	WHC-CM-7-5
9.c.(4)(d)[1]	In addition, the following requirements shall apply to the use and/or potential exposure to carcinogens. Signs warning of the presence of chemical carcinogens shall be posted at all entrances to regulated work areas.	WHC-CM-4-40
9.c.(4)(e)	In addition, the following requirements shall apply to the use and/or potential exposure to carcinogens. Good hygiene shall be maintained through work practices, such as: use of protective clothing; availability of showers and change rooms; bans on eating, drinking, and smoking in regulated areas; and use of nonpermeable work surfaces.	
9.c.(4)(f)[1]	In addition, the following documents requirements shall apply to the use and/or potential exposure to carcinogens. Procedures shall be established for emergency action involving chemical carcinogens....	WHC-CM-1-3 WHC-CM-4-40
9.c.(4)(f)[2]	In addition, the following requirements shall apply to the use and/or potential exposure to carcinogens. Occurrences which could result in exposure of personnel or release to the environment shall be investigated and, if appropriate, reported (refer to DOE 5484.1).	WHC-CM-7-5
9.d.(1)	The staff responsible for the direction and operation of the industrial hygiene program must be professionally qualified, adequate in number, and have sufficient time and authority to design and implement the industrial hygiene program set forth in this Order.	WHC-CM-1-2
9.e.[1]	Facilities, Instrumentation, and Technical Support Personnel shall be available to implement the requirements of this Order.	WHC-CM-1-2 WHC-CM-4-40
9.e.[2]	Provisions shall be made to take and analyze air and water samples and bioassay specimens, and to test, calibrate, and maintain instruments.	
9.e.[3]	Where it is impractical to provide these services on-site, the services of off-site laboratory facilities and instrument services shall be retained.	WHC-CM-1-2

Criteria	DOE Order 5480.10, "Contractor Industrial Hygiene Program"	Mandatory
9.f.(1)[1]	An inventory of occupational health hazards shall be maintained.	WHC-CM-4-40
9.f.(2)[1]	The industrial hygiene staff's evaluation of potential health hazards shall be documented in written reports.	
9.f.(2)[2]	If a deficiency is identified the report shall recommend corrective actions.	
9.f.(2)[3]	The report, along with any response from line management and/or documentation of corrective actions, shall be retained.	
9.f.(3)[1]	The data resulting from occupational environmental monitoring shall be easily retrievable.	
9.f.(4)	Records shall be retained in accordance with DOE 1324.2, RECORDS DISPOSITION.	
9.f.(5)[1]	Industrial hygiene hazard inventories, reports, and monitoring data shall be readily accessible to the medical organization responsible for operating the medical monitoring program.	WHC-CM-4-3
9.f.(5)[2]	Records access shall be provided to employees or designated representatives of employees in accordance with OSHA Regulation 29 CFR 1910.20 and DOE Privacy Act Regulation 10 CFR 1008.17(b)(5).	WHC-CM-4-40

DOE Order 5480.11, Radiation Protection for Occupational Workers

The following Reference(s) have been cited in the attached DOE Order 5480.11, "Radiation Protection for Occupational Workers", Compliance Assessment.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-6, *WHC Radiological Control Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-1, *Emergency Plan*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-9, *Radiological Design*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-10, *Radiation Protection*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-11, *ALARA Program Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-16, *Dosimetry and Medical Services Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-43, *Emergency Management Procedures*, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5480.11, "Radiation Protection for Occupational Workers"	Mandatory
9.a. [1]	It is DOE's policy that exposures to radiation resulting from DOE operations be maintained within limiting values given in paragraph 9 and as far below all limiting values as reasonably achievable.	WHC-CM-1-6
9.a. [2]	This policy applies to annual, committed, and cumulative dose equivalents.	WHC-CM-1-6
9.a. [3]	Plans and programs used to assure that occupational radiation exposures are maintained ALARA shall be documented.	WHC-CM-1-6
9.b. [1]	The exposure of an occupational worker to radiation resulting from routine DOE activities shall not cause the limiting values for assessed dose specified herein and summarized in Figure 1 to be exceeded.	WHC-CM-1-6
9.b. [3]	(Note: Natural background and therapeutic and diagnostic medical exposures are not to be included in dose records or in assessment of dose against limiting values.	WHC-CM-1-6
9.b.(1)	The limiting value of annual effective dose equivalent from both internal and external sources received in any year by an occupational worker is 5 rem (0.05 sievert).	WHC-CM-1-6
9.b.(2)	The limiting value of annual dose equivalent received in any year by an occupational worker, for individual organs and tissue is 15 rem (0.05 sievert) to the lens of the eye or 50 rem (0.5 sievert) to any other organ, tissue (including the skin of the whole body), or extremity of the body.	WHC-CM-1-6
9.b.(3)[1]	The limiting value of annual dose equivalent received by the unborn child from the period of conception to birth (entire gestation period) as a result of occupational exposure of a female occupational worker, who has notified her employer in writing that she is pregnant, is 0.5 rem (0.005 sievert).	WHC-CM-1-6
9.b.(3)[2]	Efforts should be made to avoid substantial variation above the uniform monthly exposure rate that would satisfy this limiting value.	
9.b.(3)[3]	If the dose to the unborn child is determined to have already exceeded 0.5 rem (0.005 sievert) by the time a worker notifies her employer in writing of her pregnancy, the worker shall not be assigned to tasks where additional occupational exposure is likely.	WHC-CM-1-6
9.b.(3)[4]	The limiting value of dose equivalent to the unborn and the assignment of female workers (who have declared pregnancy in writing to their employer) to tasks where additional occupational exposure is not likely does not create a basis for discrimination...	WHC-CM-1-6
9.c.[1]	Planned special exposures (nonemergency) that would result in an individual exceeding the annual effective dose equivalent limit are allowed in highly unusual situations where alternatives which would avoid higher exposures are unavailable or impractical.	
9.c.[2]	Such planned special exposures, together with the annual occupational dose received or anticipated to be received in that year, shall not exceed 2 times the annual effective dose equivalent limit specified in paragraph 9b(1).	WHC-CM-1-6
9.c.[3]	Planned special exposures require the approval of the Head of the DOE Field Organization.	WHC-CM-1-6
9.c.[4]	A second planned special exposure to the same individual at any time requires the approval of the Assistant Secretary for Environment, Safety, and Health (EH-1).	WHC-CM-1-6

Criteria	DOE Order 5480.11, "Radiation Protection for Occupational Workers"	Mandatory
9.c.[5]	Documentation of planned special exposures shall be maintained in an individual's occupational exposure history.	WHC-CM-1-6
9.d.(1)	An individual under age 18 shall neither be employed in, nor allowed to enter, controlled areas in such a manner that he or she exceeds a limiting value of 0.1 rem (0.001 sievert) per year from the sum of the committed effective dose equivalent from internal irradiation and the annual effective dose equivalent from external irradiation.	WHC-CM-1-6
9.d.(2)[1]	Students under age 18 shall not be exposed to radiation during individually authorized educational activities such that he or she exceeds a limiting value of 0.1 rem (0.001 sievert) per year from the sum of the committed effective dose equivalent from internal irradiation and the annual effective dose equivalent from external irradiation.	WHC-CM-1-6
9.d.(2)[2]	This exposure shall be considered a part of the limit for workers under age 18 and not supplemental to it [i.e., where individuals under age 18 are exposed to radiation both as a student and as a minor in a year, their exposure as a student shall be added to their exposure as a minor and the total is not to exceed the single limiting value of 0.1 rem for minors].	WHC-CM-1-6
9.e.[1]	The effective dose equivalent received by any member of the public resulting from exposure during direct onsite access at a DOE facility shall not exceed a limiting value of 0.1 rem (0.001 sievert) per year from the committed effective dose equivalent from internal irradiation plus the effective dose equivalent from any external irradiation.	WHC-CM-1-6
9.e.[2]	In addition, exposures shall not cause a dose equivalent to any tissue (including the skin and the lens of the eye) to exceed 5 rem (0.05 sievert) per year for any member of the public.	WHC-CM-1-6
9.f.(1)[1]	The annual effective dose equivalent to an individual shall be determined by summing the annual effective dose equivalents from internally deposited radionuclides and from external exposure to radioactive material and/or radiation generating devices resulting from DOE activities.	WHC-CM-1-6
9.f.(1)[2]	When in-vivo and/or in-vitro measurements confirm the retention of radionuclides in the body, with respect to evaluating conformance with the limiting value for occupational exposure, the annual effective dose equivalent due to all radionuclides retained in the body from these intakes shall be assessed for as long as the annual effective dose equivalent is 10 mrem or greater.	WHC-CM-1-6
9.f.(1)[3]	For uniform external irradiation of the whole body, a weighting factor (Wt) equal to one may be used.	
9.f.(1)[4]	This whole body dose is to be measured in accordance with the provisions in paragraph 9g(1).	WHC-CM-1-6
9.f.(2)(a)	For nonuniform exposures to skin from x-rays, beta radiation, or skin contamination, one of the following assessments shall be made and recorded: When the area of skin exposed is $>100 \text{ cm}^2$ the maximum value of dose averaged over any area of 100 cm^2 is to be assessed, recorded, and included in the annual skin (shallow) dose equivalent.	WHC-CM-4-16
9.f.(2)(b)[1]	For nonuniform exposures to skin from x-rays, beta radiation, or skin contamination, one of the following assessments shall be made and recorded: When the area of skin exposed is $>10 \text{ cm}^2$ but $<100 \text{ cm}^2$ the dose equivalent to that tissue is to be determined by: $H = fd$	WHC-CM-4-16
9.f.(2)(b)[2]	In no case shall an "f" of <0.1 be used.	WHC-CM-4-16

Criteria	DOE Order 5480.11, "Radiation Protection for Occupational Workers"	Mandatory
9.f.(2)(b)(3)	This value of dose is to be recorded and included in the annual skin (shallow) dose equivalent.	WHC-CM-4-16
9.f.(2)(c)	For nonuniform exposures to skin from x-rays, beta radiation, or skin contamination, one of the following assessments shall be made and recorded: When the area of skin exposed is $<10 \text{ cm}^2$ the maximum value of dose averaged over any 1 cm^2 is to be assessed and recorded in the individual's occupational exposure history as a special entry but is not to be included in the annual skin (shallow) dose equivalent.	WHC-CM-4-16
9.f.(3)(1)	When an occupational worker has been exposed to radiation in excess of the limits specified in this Order as a result of an unplanned or accidental situation, the decision to allow the worker to return to work in a radiological area shall be made by operating management based on advice from health physics and medical personnel and the concurrence of the worker and shall be subject to the approval of the DOE Field organization manager.	WHC-CM-1-6
9.f.(3)(2)	The dose received in an unplanned or accidental situation is to be documented in the radiation exposure record of the exposed individual pursuant to paragraph 9m(2) and reported pursuant to DOE 5484.1.	WHC-CM-1-6
9.f.(3)(3)	The operating contractor is to verify to the head of the responsible field organization that the conditions under which the emergency or accidental exposures were received have been eliminated.	WHC-CM-1-3
9.f.(3)(4)	The resumption of operations following an emergency or accidental exposure in excess of the occupational limits specified in this Order shall be subject to the approval of the head of the responsible field organization.	WHC-CM-1-6
9.f.(3)(5)	Investigations and reporting shall be conducted pursuant to DOE 5484.1 and DOE 5000.3.	WHC-CM-1-6
9.f.(4)(a)	The DAC values or other air concentration values shall not be used for the calculation of internal dose equivalent received by a worker except for unusual circumstances where bioassay data is unavailable or inadequate.	WHC-CM-1-6
9.f.(4)(b)	Concentrations of radionuclides in drinking water in controlled areas shall not exceed the standards given in 40 CFR Part 141.	WHC-CM-1-6
9.f.(5)	Quality Factors. The dose equivalent limits specified in this chapter are expressed in terms of rem; this requires that the absorbed dose (expressed in rads) be multiplied by an appropriate quality factor (Q).	WHC-CM-1-6
9.g. (1)	Occupational workers shall be monitored, as appropriate, to demonstrate compliance with the radiation protection standards in paragraph 9b and to estimate the dose equivalents received from external and internal sources of radiation.	WHC-CM-1-6
9.g. (2)	Workplaces shall be routinely monitored, as appropriate, for identification and control of potential exposure sources.	WHC-CM-1-6
9.g.(1)(1)	Personnel dosimetry programs shall be adequate to demonstrate compliance with the radiation protection standards provided in paragraph 9b.	WHC-CM-1-6
9.g.(1)(2)	Personnel dosimeters shall be routinely calibrated and maintained and shall meet the requirements of the DOE Laboratory Accreditation Program for Personnel Dosimetry as specified in DOE 5480.15.	WHC-CM-1-6

Criteria	DOE Order 5480.11, "Radiation Protection for Occupational Workers"	Mandatory
9.g.(1)(a)	Personnel dosimetry shall be provided to radiation workers who have the potential to exceed in a year any one of the following from external sources: 100 mrem (0.001 sievert) annual effective dose equivalent to the whole body.	WHC-CM-1-6 WHC-CM-4-16
9.g.(1)(b)	Personnel dosimetry shall be provided to radiation workers who have the potential to exceed in a year any one of the following from external sources: 5 rem (0.05 sievert) annual dose equivalent to the skin.	WHC-CM-1-6 WHC-CM-4-16
9.g.(1)(c)	Personnel dosimetry shall be provided to radiation workers who have the potential to exceed in a year any one of the following from external sources: 5 rem (0.05 sievert) annual dose equivalent to any extremity.	WHC-CM-1-6 WHC-CM-4-16
9.g.(1)(d)	Personnel dosimetry shall be provided to radiation workers who have the potential to exceed in a year any one of the following from external sources: 1.5 rem (0.015 sievert) annual dose equivalent to the lens of the eye.	WHC-CM-1-6 WHC-CM-4-16
9.g.(2)[1]	Internal dose evaluation programs (including routine bioassay programs) shall be adequate to demonstrate compliance with the radiation protection standards in paragraph 9b.	WHC-CM-1-6
9.g.(2)[2]	Such programs are required for radiation workers exposed to surface or airborne radioactive contamination where the worker could receive 0.1 rem (0.001 sievert) annual effective dose equivalent from all intakes of all radionuclides for occupational sources, or if any organ or tissue dose equivalent could exceed 5 rem (0.05 sievert) annual dose equivalent.	WHC-CM-1-6
9.g.(3)(a)[1]	Ambient air monitoring shall be performed in occupied areas with the potential to exceed 10 percent of any derived air concentration values given in Attachment 1.	WHC-CM-1-6
9.g.(3)(a)[3]	Data obtained from air monitoring shall be used for assessing the control of airborne radioactive material in the workplace...	WHC-CM-1-6
9.g.(3)(a)[4]	...it should not normally be used to evaluate the dose equivalent to radiation workers.	
9.g.(3)(a)[5]	Air monitors shall be routinely calibrated and maintained,...	NA
9.g.(3)(b)[1]	Appropriate stationary (area) and/or portable radiation instruments shall be available and used to measure dose rates for the purpose of controlling exposure to radiation.	WHC-CM-1-6
9.g.(3)(b)[2]	These instruments shall be routinely calibrated and maintained.	WHC-CM-1-6
9.g.(3)(b)[3]	The combination of instruments used shall provide capability to measure types of radiation (neutron, gamma, beta, or x-radiation) and dose rates characteristic of that which could be encountered at that facility.	WHC-CM-1-6
9.g.(4)	Appropriate instruments and techniques shall be used to provide contamination monitoring and control as described below...	WHC-CM-1-6
9.g.(4)(a)[2]	...but in any case contamination shall not exceed the levels defined in Attachment 2.	WHC-CM-1-6
9.g.(4)(b)[1]	Workplace Surfaces in Radiological Areas shall be posted (paragraph 9k) and controlled, as appropriate.	WHC-CM-1-6
9.g.(4)(c)[1]	Personnel and Personal Property Contamination Monitoring shall be provided, as appropriate, and used immediately prior to or after exits from radiological areas established to control surface or airborne radioactive contamination.	WHC-CM-1-6

Criteria	DOE Order 5480.11, "Radiation Protection for Occupational Workers"	Mandatory
9.g.(4)(c)[2]	If monitoring is performed after the exit, appropriate controls shall be implemented to prevent the loss of control of contamination.	WHC-CM-1-6
9.g.(4)(c)[3]	Detectable contamination on personnel and personal property should be removed by appropriate decontamination methods.	
9.h.	Methods of estimating the dose equivalent from external and internal sources of radiation are to be appropriate to the workplace conditions and consistent with the recommendations of NCRP, ICRP, and EPA.	WHC-CM-1-6
9.i [1]	In all cases, contaminated property shall be cleaned as thoroughly as practical before release.	WHC-CM-1-6
9.i [2]	These requirements are not applicable to the release of materials or equipment of unrestricted use since such use could result in exposure to the general public.	WHC-CM-1-6
9.i [3]	(NOTE: Requirements contained in this Order do not pertain to either induced radioactivity or decontamination and decommissioning release limits.)	
9.i(1)(a)	Material and equipment in radiological areas established to control surface or airborne radioactive material shall be treated as radioactive material and shall not be released from radiological areas to controlled areas if any of the following conditions exist: Measurements of accessible surfaces show that either the total or removable contamination levels exceed the guides specified in Attachment 2; or...	WHC-CM-1-6
9.i(1)(b)	Material and equipment in radiological areas established to control surface or airborne radioactive material shall be treated as radioactive material and shall not be released from radiological areas to controlled areas if any of the following conditions exist: Prior use suggests that the contamination levels on inaccessible surfaces are likely to exceed the guides specified in Attachment 2.	WHC-CM-1-6
9.i(2)	Material and equipment exceeding the total and removable contamination levels specified in Attachment 2 shall be conditionally released for movement onsite from one radiological area for immediate placement in another radiological area only if appropriate monitoring and control procedures are established and exercised.	WHC-CM-4-10
9.i(3)[1]	Under exceptional conditions, material and equipment with fixed contamination that exceed the limits specified in Attachment 2 may be released for use in controlled areas outside radiological areas.	
9.i(3)[2]	As a condition of such release, the materials shall be routinely monitored, clearly labeled and/or tagged to alert personnel of the contaminated status, and have appropriate administrative procedures established and exercised to maintain control of these items.	WHC-CM-1-6
9.i(4)	The records for release of potentially contaminated material and equipment shall describe the property, the date of the last monitoring operation, the identity of the individual who performed the monitoring operation, the type and identification number of the monitoring instrument used, and the results of the monitoring operation.	WHC-CM-1-6
9.j. [1]	Radiation exposure rates in controlled workplace areas should be reduced to ALARA levels by proper facility design and control.	
9.j. [2]	The primary means for maintaining exposures to ALARA are to be through physical controls...	WHC-CM-4-11
9.j. [3]	...Administrative controls and procedural requirements are to be considered supplemental means to achieve control.	WHC-CM-4-11

Criteria	DOE Order 5480.11, "Radiation Protection for Occupational Workers"	Mandatory
9.j.(1)(a)	During the design of facilities, the following objectives shall be applied: Optimization Principles, as discussed in ICRP Publication 37, are to be utilized in developing and justifying facility design and physical controls.	WHC-CM-4-9 WHC-CM-4-10
9.j.(1)(b)[1]	During the design of facilities, the following objectives shall be applied: The design objectives for personnel exposure from external sources of radiation in continuously occupied controlled areas are ALARA and not exceeding 0.5 mrem (5 microsieverts) per hour on average.	WHC-CM-4-9
9.j.(1)(b)[2]	During the design of facilities, the following objectives shall be applied: The design objectives for exposure rates for potential exposure to a radiation worker where occupancy is generally not continuous are ALARA and not exceeding 20 percent of the applicable standard in paragraphs 9b(1) and (2).	WHC-CM-4-9
9.j.(1)(c)[1]	During the design of facilities, the following objectives shall be applied: As a design objective, exposure of personnel to inhalation of airborne radioactive materials is to be avoided under normal operating conditions to the extent reasonably achievable.	WHC-CM-1-6
9.j.(1)(d)	During the design of facilities, the following objectives shall be applied: Ease of maintenance and decontamination and decommissioning is to be considered in facility design and selection of materials.	WHC-CM-4-11
9.j.(2)[1]	During routine operations, the combination of design and control procedures shall provide that, with respect to the radiological workplace, the anticipated magnitude of the prospective committed effective dose equivalent from intakes plus any effective dose equivalent from external exposure will not exceed 5 rem (0.05 sievert) in a year, and the anticipated magnitude of the committed dose equivalent to any organ or tissue from intakes plus any dose equivalent from external exposure will not exceed 50 rems (0.5 sievert) in a year.	WHC-CM-1-6
9.j.(2)[2]	Compliance with these requirements shall be demonstrated through appropriate workplace monitoring pursuant to the provisions of paragraph 9g(3).	WHC-CM-1-6
9.k. [1]	Areas in DOE nuclear facilities shall be posted in accordance with the provisions given below.	WHC-CM-1-6
9.k. [2]	Radioactive material and/or its container shall be individually labeled where normal posting of the area and control of the material would not provide adequate protection.	WHC-CM-1-6
9.k. [3]	The design of signs, labels, and the radiation symbol shall conform to ANSI N12.1-1971 and ANSI N2.1-1971.	WHC-CM-1-6
9.k. [4]	The background color is to be yellow; the symbol color may be black or magenta.	WHC-CM-1-6
9.k.(1)[1]	The access to any controlled area where radioactive materials or elevated radiation fields may be present shall be clearly and conspicuously posted as a controlled area.	WHC-CM-1-6
9.k.(1)[2]	The type of sign used may be selected by the contractor with the approval of the field organization to avoid conflict with local security requirements.	
9.k.(2)(a)[1]	The access to any area where an individual can at anytime during normal operations receive a dose equivalent greater than 5 mrem (50 microsieverts) in 1 hour at 30 cm from the radiation source or any surface through which radiation penetrates shall be posted as below.	WHC-CM-1-6
9.k.(2)(a)[2]	In addition, the anticipated dose rate or range of dose rates shall be included on or in conjunction with each of the signs, as appropriate.	WHC-CM-1-6

Criteria	DOE Order 5480.11, "Radiation Protection for Occupational Workers"	Mandatory
9.k.(2)(a)1	"Radiation Area" for any area within a controlled area where an individual can receive a dose equivalent greater than 5 mrem (50 microsieverts) but less than 100 mrem (1 millisievert) in 1 hour at 30 cm from the radiation source or from any surface through which the radiation penetrates...	WHC-CM-1-6
9.k.(2)(a)2	"High Radiation Area" for any area within a controlled area where an individual can receive a dose equivalent of 100 mrem or greater (0.001 sievert) but less than 5 rem (0.005 sievert) or greater in 1 hour at 30 cm from the radiation source or from any surface through which the radiation penetrates, and....	WHC-CM-1-6
9.k.(2)(a)3	"Very High Radiation Area" for any area within a controlled area where an individual can receive a dose of 5 rem (0.05 sievert) or greater in 1 hour at 30 cm from the radiation source or from any surface through which the radiation penetrates.	WHC-CM-1-6
9.k.(2)(b)[1]	The access to any area where airborne radioactive material concentrations greater than 1/10 of the derived air concentrations (Attachment 1) are present shall be clearly and conspicuously posted with a sign that identifies the radiological conditions which exist.	WHC-CM-1-6
9.k.(2)(b)[2]	The type of sign used shall be consistent with the radiation control policies established at the facility...	WHC-CM-1-6
9.k.(2)(b)[3]	...and may be selected by the contractor with the approval of the field organization.	
9.k.(2)(c)[1]	The access to any area where surface contamination levels greater than 10 times those specified in Attachment 2 are present shall be clearly and conspicuously posted with a sign that identifies the radiological conditions which exist.	WHC-CM-1-6
9.k.(2)(c)[2]	The type of sign used shall be consistent with the radiation control policies established at the facility...	WHC-CM-1-6
9.k.(2)(c)[3]	...and may be selected by the contractor with the approval of the field organization.	
9.l. [1]	An appropriate entry control program shall be established for radiological areas.	WHC-CM-1-6
9.l. [3]	The level of control should be consistent with the degree of hazard.	
9.l. [5]	Step-off pads and protective clothing shall be required for entry to contaminated areas.	WHC-CM-1-6
9.l.(1)	For very high radiation areas, the entry control program shall include at a minimum one of the following: Control devices on each entrance or access point which function automatically to prevent entry when a very high radiation area exists; permit entry only after the radiation level is reduced below 0.1 rem (0.001 sievert) per hour; and prevent use or operation of the radiation source, thereby preventing the existence of a very high radiation area, while an individual is in the area.	WHC-CM-1-6
9.l.(2)[1]	For very high radiation areas, the entry control program shall include at a minimum one of the following: A control device which energizes a conspicuous visible or audible alarm signal so that the individual entering the very high radiation area through a failed control device is aware of the radiation level and radiation protection personnel are aware of the entry.	WHC-CM-1-6
9.l.(2)[2]	Administrative procedures shall define the required actions of personnel when alarms are activated.	WHC-CM-1-6
9.l.(3)	Locked entry ways, except during periods when access to the area is required, with positive control over and radiation surveys made for the initial entry and periodically as necessary.	WHC-CM-1-6

Criteria	DOE Order 5480.11, "Radiation Protection for Occupational Workers"	Mandatory
9.l.(4)	Control devices that will automatically generate audible and visible alarm signals to alert personnel in the area before use or operation of the radiation source and in sufficient time to permit evacuation of the area or the activation of a secondary control device which will prevent use or operation of the source.	WHC-CM-1-6
9.m. [1]	As a minimum, the records specified below of the radiation protection program and dosimetry records for all individual for whom monitoring is provided shall be generated and maintained, commencing with the effective date of this Order.	WHC-CM-1-6
9.m. [2]	Information and data developed pursuant to this Order shall be retained consistent with the requirements of DOE 1324.2A, RECORDS DISPOSITION.	WHC-CM-1-6
9.m.(1)	Records of ALARA programs shall be maintained by field organizations and operating contractors to demonstrate the adequacy of the ALARA plans and programs and their implementation.	WHC-CM-1-6
9.m.(2)[1]	Individual occupational internal and external dose records and records of the programs used to assess individual doses shall be generated and maintained sufficient to provide appropriate reports to the employee, management, and those required by DOE 5484.1.	WHC-CM-1-6
9.m.(2)(a)1	As a minimum, the following data shall be recorded and retained for individuals for whom monitoring, as appropriate, was provided: Annual effective dose equivalent received during the year from radioactive material deposited in the body...	WHC-CM-1-6
9.m.(2)(a)2	As a minimum, the following data shall be recorded and retained for individuals for whom monitoring, as appropriate, was provided: Annual dose equivalent to organ or tissue of concern received during the year from radioactive material deposited in the body...	WHC-CM-1-6
9.m.(2)(a)3	As a minimum, the following data shall be recorded and retained for individuals for whom monitoring, as appropriate, was provided: Committed effective dose equivalent from intakes occurring during the year...	WHC-CM-1-6
9.m.(2)(a)4	As a minimum, the following data shall be recorded and retained for individuals for whom monitoring, as appropriate, was provided: Committed dose equivalent to organ or tissue of concern from intakes occurring during the year.	WHC-CM-1-6
9.m.(2)(b)1	As a minimum, the following data shall be recorded and retained for individuals for whom monitoring, as appropriate, was provided: Annual effective dose equivalent from external sources of radiation received during the year.	WHC-CM-1-6
9.m.(2)(b)2	As a minimum, the following data shall be recorded and retained for individuals for whom monitoring, as appropriate, was provided: Annual dose equivalent to the lens of the eye.	WHC-CM-1-6
9.m.(2)(b)3	As a minimum, the following data shall be recorded and retained for individuals for whom monitoring, as appropriate, was provided: Annual dose equivalent to the skin.	WHC-CM-1-6
9.m.(2)(b)4	As a minimum, the following data shall be recorded and retained for individuals for whom monitoring, as appropriate, was provided: Annual dose equivalent to the extremities received during the year, including: (1) hands and forearm below and elbow and (2) feet and legs below the knee.	WHC-CM-1-6

Criteria	DOE Order 5480.11, "Radiation Protection for Occupational Workers"	Mandatory
9.m.(2)(c)1	As a minimum, the following data shall be recorded and retained for individuals for whom monitoring, as appropriate, was provided: Summation of the annual effective dose equivalents received from external and internal sources during the year.	WHC-CM-1-6
9.m.(2)(c)2	As a minimum, the following data shall be recorded and retained for individuals for whom monitoring, as appropriate, was provided: Cumulative annual effective dose equivalent received from external and internal sources while employed at the facility, since the effective date of this Order.	WHC-CM-1-6
9.m.(2)(d)	As a minimum, the following data shall be recorded and retained for individuals for whom monitoring, as appropriate, was provided: Data necessary to support or recalculate doses at a later date shall be maintained pursuant to Section 4 of ANSI N13.6-1972.	WHC-CM-1-6
9.m.(3)	Records that establish the conditions under which individuals were exposed, such as facility and surveys for the release of personal property and workplace surfaces, shall be kept to provide a chronological, historical record pursuant to Section 5 of ANSI N13.6-1972.	WHC-CM-1-6
9.m.(4)[1]	Records shall be kept to document the appropriateness, quality, and accuracy of monitoring methods, to Section 6 of ANSI N13.6-1972.	WHC-CM-1-6
9.m.(4)[2]	Changes in equipment, techniques, and procedures are to be documented and documents maintained.	WHC-CM-1-6
9.m.(5)[1]	Training records of plant employees, radiation workers, and radiation safety personnel shall be retained to document the level of understanding and proficiency of personnel who work with radioactive materials.	WHC-CM-1-6
9.n. [1]	Records of exposure should be made available to all occupational workers on an individual basis and should be provided to terminated employees as soon as the data is available but within 90 days of termination.	WHC-CM-1-6
9.n. [2]	A summary of annual, cumulative, and committed effective dose equivalent shall be provided to each radiation worker on an annual basis.	WHC-CM-1-6
9.n. [3]	The cumulative effective dose equivalent is the sum of the annual effective dose equivalents recorded for each year of employment since the effective date of the Order.	WHC-CM-1-6
9.n. [4]	Detailed information concerning a worker's exposure shall be made available to the worker upon the request of the worker, consistent with the provisions of the Privacy Act (5 USC 552a).	WHC-CM-1-6
9.o.(1)[1]	All occupational workers who may enter a controlled area at a DOE facility shall receive an orientation in radiation safety within 1 month of their initial assignment to and prior to potential exposure to radiation at that facility.	WHC-CM-1-6
9.o.(1)[2]	Retraining shall be provided when there are significant changes to radiation protection policies and procedures which affect general plant employees and should be provided every 2 years.	WHC-CM-1-6
9.o.(1)[3]	Generic training (not specific to a facility) in all or some of the topics listed below may be waived provided: this training has been received at another DOE facility; there is provision of proof-of-training in the form of a certification document containing the individual's name, date of training, and specific topics covered; and an appropriate official has certified the training of the individual.	

Criteria	DOE Order 5480.11, "Radiation Protection for Occupational Workers"	Mandatory
9.o.(1)(a)	The level of training is to be commensurate with the employee's job assignment with the initial orientation including, but not limited to: The risk of low-level occupational radiation exposure, including cancer and genetic effects...	WHC-CM-1-6
9.o.(1)(b)	The level of training is to be commensurate with the employee's job assignment with the initial orientation including, but not limited to: The risk of prenatal radiation exposure...	WHC-CM-1-6
9.o.(1)(c)	The level of training is to be commensurate with the employee's job assignment with the initial orientation including, but not limited to: Basic radiation protection concepts...	WHC-CM-1-6
9.o.(1)(d)	The level of training is to be commensurate with the employee's job assignment with the initial orientation including, but not limited to: DOE and company radiation protection policies and procedures...	WHC-CM-1-6
9.o.(1)(e)	The level of training is to be commensurate with the employee's job assignment with the initial orientation including, but not limited to: Employee and management responsibilities for radiation safety...	WHC-CM-1-6
9.o.(1)(f)	The level of training is to be commensurate with the employee's job assignment with the initial orientation including, but not limited to: Emergency procedures.	WHC-CM-1-6
9.o.(2)[1]	Radiation worker training programs and retraining shall be established and conducted at a sufficient frequency (not to exceed a period of 2 years) to familiarize the worker with the fundamentals of radiation protection and the ALARA process.	WHC-CM-1-6
9.o.(2)[3]	The training shall be concurrent with assignment as a radiation worker only if the worker is accompanied by and under the direct supervision of a trained radiation worker; otherwise, the training shall precede assignment as a radiation worker.	WHC-CM-1-6
9.o.(2)[4]	Generic training (not specific to a facility) in all or some of the topics listed below may be waived provided: this training has been received at another DOE facility; there is provision of proof-of-training in the form of a certification document containing the individual's name, date of training, and specific topics covered; and an appropriate official has certified the training of the individual.	
9.o.(2)(a)	...the level of training in the following topics is to be commensurate with each worker's assignment: Radioactivity and radioactive decay...	WHC-CM-1-6
9.o.(2)(b)	...the level of training in the following topics is to be commensurate with each worker's assignment: Characteristics of ionizing radiation...	WHC-CM-1-6
9.o.(2)(c)	...the level of training in the following topics is to be commensurate with each worker's assignment: Manmade radiation sources...	WHC-CM-1-6
9.o.(2)(d)	...the level of training in the following topics is to be commensurate with each worker's assignment: Acute effects of exposure to radiation...	WHC-CM-1-6
9.o.(2)(e)	...the level of training in the following topics is to be commensurate with each worker's assignment: Risks associated with occupational radiation exposures...	WHC-CM-1-6
9.o.(2)(f)	...the level of training in the following topics is to be commensurate with each worker's assignment: Special considerations in the exposure of women of reproductive age...	WHC-CM-1-6

Criteria	DOE Order 5480.11, "Radiation Protection for Occupational Workers"	Mandatory
9.o.(2)(g)	...the level of training in the following topics is to be commensurate with each worker's assignment: Dose-equivalent limits...	WHC-CM-1-6
9.o.(2)(h)	...the level of training in the following topics is to be commensurate with each worker's assignment: Mode of exposure--internal and external...	WHC-CM-1-6
9.o.(2)(i)	...the level of training in the following topics is to be commensurate with each worker's assignment: Dose-equivalent determination...	WHC-CM-1-6
9.o.(2)(j)	...the level of training in the following topics is to be commensurate with each worker's assignment: Basic protective measures--time, distance, shielding...	WHC-CM-1-6
9.o.(2)(k)	...the level of training in the following topics is to be commensurate with each worker's assignment: Specific plan procedures for maintaining exposure to ALARA...	WHC-CM-1-6
9.o.(2)(l)	...the level of training in the following topics is to be commensurate with each worker's assignment: Radiation survey instrumentation-- calibration and limitations...	WHC-CM-1-6
9.o.(2)(m)	...the level of training in the following topics is to be commensurate with each worker's assignment: Radiation monitoring programs and procedures...	WHC-CM-1-6
9.o.(2)(n)	...the level of training in the following topics is to be commensurate with each worker's assignment: Contamination control, including protective clothing and equipment and workplace design...	WHC-CM-1-6
9.o.(2)(o)	...the level of training in the following topics is to be commensurate with each worker's assignment: Personnel decontamination...	WHC-CM-1-6
9.o.(2)(p)	...the level of training in the following topics is to be commensurate with each worker's assignment: Emergency procedures...	WHC-CM-1-6
9.o.(2)(q)	...the level of training in the following topics is to be commensurate with each worker's assignment: Warning signs and alarms...	WHC-CM-1-6
9.o.(2)(r)	...the level of training in the following topics is to be commensurate with each worker's assignment: Responsibilities of employees and management...	WHC-CM-1-6
9.o.(2)(s)	...the level of training in the following topics is to be commensurate with each worker's assignment: Interaction with radiation protection staff...	WHC-CM-1-6
9.o.(2)(t)	...the level of training in the following topics is to be commensurate with each worker's assignment: Operational procedures associated with specific job assignments.	WHC-CM-1-6
9.o.(3)[1]	Radiation protection technician training and retraining programs shall be established and conducted at a sufficient frequency, not to exceed every 2 years, to familiarize technicians with the fundamentals of radiation protection and the proper procedures for maintaining exposures ALARA.	WHC-CM-1-6
9.o.(3)[2]	This program shall include both classroom and applied training and shall precede or be concurrent with assignment as a radiation protection technician while under the supervision of a trained individual.	WHC-CM-1-6

Criteria	DOE Order 5480.11, "Radiation Protection for Occupational Workers"	Mandatory
9.o.(3)[5]	The level of training in each topic is to be commensurate with the technician's assignment.	WHC-CM-1-6
9.p.(2)(a)[1]	Multiple hazards and alternate methods are to be taken into account...	WHC-CM-4-1 WHC-CM-4-43
9.p.(2)(d)[2]	When feasible, volunteers should be evaluated with respect to age and previous exposure history.	
9.p.(3)	Specific dose criteria and judgment factors are set forth for the three types of emergency action: Type 1, saving of human life; Type 2, recovery of deceased victims; and Type 3, protection of health and property.	
9.p.(3)(a)1	Attempts to rescue victims of an incident should be regarded in the same context as any other emergency action involving the rescue of victims, regardless of the type of hazard involved.	
9.p.(3)(a)2	If the victim is considered to be alive, the course of action should be determined by the person onsite having the emergency action responsibility.	
9.p.(3)(a)3[1]	The potential amount of exposure to rescue personnel for each specific Type 1 emergency action shall be evaluated by the person onsite having the emergency action responsibility.	WHC-CM-4-1 WHC-CM-4-43
9.p.(3)(b)1[2]	Except as provided in subparagraph 3 below, the amount of radiation exposure received by persons in recovery operations shall be controlled within existing occupational exposure limits.	WHC-CM-4-1 WHC-CM-4-43
9.p.(3)(c)2	When the risk of radiation following the incident is such that life might be in jeopardy, or that there might be severe effects on health or the public or loss of property inimical to the public safety, the criteria for saving of human life shall apply.	WHC-CM-4-1 WHC-CM-4-43
9.q.	These requirements are applicable to DOE contractor installations possessing sufficient quantities and kinds of fissile material to potentially constitute a critical mass as defined in DOE 5480.5, and where the excessive exposure of personnel to radiation from a nuclear accident is possible.	WHC-CM-1-6
9.q.(1)(a)	The basic elements of nuclear accident dosimetry shall include: A method to conduct initial "screening" of personnel involved in nuclear accidents to determine if they have received a significant radiation exposure.	WHC-CM-1-6
9.q.(1)(b)	The basic elements of nuclear accident dosimetry shall include: Methods for analysis of biological materials (including sodium-24 activity in blood and phosphorus-32 activity in hair).	N/A
9.q.(1)(c)	The basic elements of nuclear accident dosimetry shall include: A system of fixed units capable of yielding estimated radiation dose and the approximate neutron spectrum at their locations.	WHC-CM-1-6
9.q.(1)(d)	The basic elements of nuclear accident dosimetry shall include: Personnel dosimeters capable of furnishing sufficient information to determine neutron and gamma dose and/or dose equivalent.	WHC-CM-1-6
9.q.(1)(e)	The basic elements of nuclear accident dosimetry shall include: Counting facilities to evaluate fixed and/or personnel dosimeters, sodium in blood, and phosphorus in hair.	N/A
9.q.(2)(a)	The fixed unit shall be capable of determining neutron dose in rad (gray) with an accuracy of +/- 25 percent.	N/A
9.q.(2)(b)	The fixed unit shall be capable of providing the approximate neutron spectrum to permit the conversion of rad to rem.	N/A

Criteria	DOE Order 5480.11, "Radiation Protection for Occupational Workers"	Mandatory
9.q.(2)(c)	The dose range capability of the neutron components of the fixed unit shall extend from 10 rad (0.1 gray) to about 10,000 rad (100 gray).	N/A
9.q.(2)(d)	The gamma ray components of the fixed unit shall be capable of measuring fission gamma radiation in the presence of neutrons with an accuracy of approximately +/- 20 percent.	N/A
9.q.(2)(e)	The dose range capability of the gamma components shall extend from 10 rem (0.10 sievert) to about 10,000 rem (100 sievert).	N/A
9.q.(2)(f)[1]	The number of dosimeter units needed and their placement will depend on the nature of the operation, structural design of the facility, and accessibility of areas to personnel.	
9.q.(2)(f)[3]	The number and placement of dosimeters shall be periodically reevaluated, as appropriate, to ensure that modifications to facility design and use have not affected performance.	N/A
9.q.(2)(f)[4]	An analysis that demonstrates that the dosimeters and their placement will satisfy the performance criteria contained in paragraph q shall be documented.	N/A
9.q.(2)(f)[5]	The analysis shall include the number of units, their location, and effect of intervening shielding.	N/A
9.q.(3)(a)	Personnel Nuclear Accident Dosimeter Units shall be worn by all personnel who enter a controlled area that contains locations requiring an installed criticality alarm system given in paragraph 11c(3)(g) of DOE 5480.5.	WHC-CM-1-6
9.r.(1)	Contractor internal audits of all functional elements of the radiation protection program shall be conducted as often as necessary but no less frequently than every 3 years.	WHC-CM-1-6
Attach.1. [7]	For known mixtures of radionuclides, the sum of the ratio of the observed concentration of a particular radionuclide and its corresponding DAC for all radionuclides in the mixture must not exceed 1.0.	WHC-CM-1-6

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DOE Order 5480.18A, Accreditation of Performance-based Training for Category A Reactors and Nuclear Facilities

The following Reference(s) have been cited in the DOE Order 5480.20, "Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities", Compliance Assessments, and are applicable to DOE Order 5480.18A. However, Wise (1993) requests an exemption to DOE Order 5480.18A requirements. Thus, an assessment has not been performed (see instead DOE Order 5480.20).

WHC-CM-1-1, *Management Policies*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-2, *Organizations Charts and Charters*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-5, *Standard Operating Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-2-15, *Training Administration Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-1, *Emergency Plan*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-3, *Industrial Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-33, *Security Manual*, Westinghouse Hanford Company, Richland, Washington.

Wise, G. M., *Request for Long-Term, Permanent Exception to DOE Order 5480.18A, Accreditation of Performance-Based Training for Category A Reactors and Nuclear Facilities*, Internal Memo to J. E. Mecca (DOE), dated September 27, 1993.

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Criteria	DOE Order 5480.18A, "Accreditation of Performance-Based Training for Category A Reactors and Nuclear Facilities"	Mandatory
11.a.[1]	Contractor Self-Evaluation Reports for each training program shall be submitted.	
11.a.[2]	All Contractor Self-Evaluation Report submittals shall be made within 3 years after the approval of the associated Training Program Accreditation Plan.	
11.b.(1)[1]	Facilities that begin initial operation after November 2, 1989, but before November 2, 1992, shall submit to the cognizant field organization a Training Program Accreditation Plan at a date determined by the Head of the Field Organization, but not later than 1 year after initial operation.	
11.b.(1)[2]	Contractor Self-Evaluation Reports for each training program shall be submitted.	
11.b.(1)[3]	All Contractor Self-Evaluation Report submittals shall be made within 3 years after the approval of the associated Training Program Accreditation Plan.	
11.b.(2)[1]	All new facilities that begin initial operation after November 2, 1992, shall submit to the cognizant field organization a Training Program Accreditation Plan for accreditable training programs prior (e.g. 1 year) to initial operations.	
11.b.(2)[2]	Contractor Self-Evaluation Reports for each training program shall be submitted.	
11.b.(2)[3]	All Contractor Self-Evaluation Reports submittals shall be made within 1 year after initial operation.	
11.c.[1]	Facilities reactivated from standby status after November 2, 1989, shall submit to the cognizant field organization a Training Program Accreditation Plan prior to initial operation.	
11.c.[2]	Contractor Self-Evaluation Reports for each training program shall be submitted.	
11.c.[3]	All Contractor Self-Evaluation Reports submittals shall be made within 3 years after the approval of the associated Training Program Accreditation Plan.	
11.d.[1]	New position training programs which require accreditation and are not included in the initial Training Program Accreditation Plan shall require a Training Program Accreditation Plan at a date determined by the Head of the Field Organization.	
11.d.[3]	The Contractor Self-Evaluation Report shall be submitted within 1 year after the approval of the associated Training Program Accreditation Plan.	
12.a.(1)	The Training Accreditation Program shall encompass the following five elements essential to acceptable training programs: Systematic analysis of the jobs to be performed.	
12.a.(2)	The Training Accreditation Program shall encompass the following five elements essential to acceptable training programs: Learning objectives derived from the analysis which describe desired performance after training.	
12.a.(3)	The Training Accreditation Program shall encompass the following five elements essential to acceptable training programs: Training design and implementation based on the learning objectives.	
12.a.(4)	The Training Accreditation Program shall encompass the following five elements essential to acceptable training programs: Evaluation of trainee mastery of the objectives during training.	

Criteria	DOE Order 5480.18A, "Accreditation of Performance-Based Training for Category A Reactors and Nuclear Facilities"	Mandatory
12.a.(5)	The Training Accreditation Program shall encompass the following five elements essential to acceptable training programs: Evaluation and revision of the training based on the performance of trained personnel in the job setting.	
12.b.(1)[1]	The DOE training accreditation process shall consist of the following major activities: Applicability.	
12.b.(1)[2]	Facilities shall determine which training programs require accreditation by using the functional descriptions contained in the Training Accreditation Program Manual, TAP 1.	
12.b.(2)[1]	The DOE training accreditation process shall consist of the following major activities: Initial Self-Evaluation.	
12.b.(2)[2]	Facilities shall conduct an initial self-evaluation by comparing current training programs to the accreditation objectives and criteria contained in TAP 1.	
12.b.(3)[1]	The DOE training accreditation process shall consist of the following major activities: Training Program Accreditation Plan.	
12.b.(3)[2]	Based on the results of the initial self-evaluation, the contractor shall determine necessary improvements to the existing training program to meet the accreditation objectives and criteria.	
12.b.(3)[4]	The Training Program Accreditation Plan shall identify and prioritize the programs to be accredited and shall address all training program implementation schedules, upgrade needs and scope, manpower needs, and facility needs.	
12.b.(3)[5]	Specific training programs for which an exception to this Order is deemed appropriate shall be identified, with justification for the exception, in the plan.	
12.b.(3)[6]	The Training Program Accreditation Plan shall be approved by the Head of the Field Organization and Program Secretarial Officer, with NE-1 concurrence.	
12.b.(4)[1]	The DOE training accreditation process shall consist of the following major activities: Contractor Self-Evaluation Report.	
12.b.(4)[3]	A Contractor Self-Evaluation Report shall then be written for each training program to be accredited.	
12.b.(4)[4]	The Contractor Self-Evaluation Report shall describe how the current training program meets the accreditation objectives and criteria.	
12.b.(4)[5]	The report shall be forwarded to the field organization Accreditation Coordinator for review and coordination of approval.	
12.b.(4)[6]	The report shall then be forwarded to the Training Accreditation Program Staff.	
12.b.(5)	The DOE training accreditation process shall consist of the following major activities: Accreditation Review Team Evaluation.	
12.b.(7)	The DOE training accreditation process shall consist of the following major activities: Maintaining Accreditation.	

Criteria	DOE Order 5480.18A, "Accreditation of Performance-Based Training for Category A Reactors and Nuclear Facilities"	Mandatory
12.b.(7)(a)[1]	Accreditation shall be maintained during the 4 year period by submitting an Accreditation Maintenance Report, which includes all accredited programs, 2 years after accreditation or renewal of accreditation.	
12.b.(7)(a)[2]	The report shall provide specific information with appropriate documentation regarding actions taken during the 2 year period.	
12.b.(8) [1]	The DOE training accreditation process shall consist of the following major activities: Renewal of Accreditation.	
12.b.(8) [2]	Renewal of accreditation shall be submitted no later than 4 years from the initial accreditation and each 4 years thereafter.	
12.b.(8) [3]	The contractor shall attempt to maximize the number of programs submitted for renewal to reduce costs and impact on operations.	
12.b.(8)(a)[1]	Renewal of accreditation consists of the following activities: The contractor shall submit a Contractor Self-Evaluation Report which includes all accredited programs prior to a request for renewal.	
12.b.(8)(a)[2]	Review, approval and submittal of the Contractor Self-Evaluation Report shall be performed as described in subparagraph 12b(4).	
12.b.(8)(b)[1]	Renewal of accreditation consists of the following activities: When the Contractor Self-Evaluation Report is received by the Training Accreditation Program Staff, an Accreditation Review Team shall be appointed by the Training Accreditation Program Staff to visit the facility.	
12.b.(8)(b)[2]	The Accreditation Review Team Evaluation shall be conducted as described in subparagraphs 12b(5)(a) and (b).	
12.b.(8)(c)[1]	Renewal of accreditation consists of the following activities: The Board shall take final action to renew accreditation, continue accreditation in a probationary status for up to 120 days, or withdraw accreditation.	
12.b.(8)(c)[2]	The Board's action shall be conducted as described in subparagraph 12b(6).	
12.b.(8)(c)[3]	The Board shall inform the Manager of the Training Accreditation Program Staff of its decision.	
12.b.(8)(c)[4]	The Manager of the Training Accreditation Program Staff shall deliver the Board's decision and basis for the decision in writing to the cognizant program office and field organization Accreditation Coordinators and the contractor.	
12.b.(8)(c)[5]	If accreditation is renewed it shall normally remain in effect for 4 years.	
12.b.(8)(c)[6]	If accreditation is withdrawn or continued in a probationary status the field organization in conjunction with the program office shall be responsible to ensure that the training program(s) are upgraded to meet the accreditation objectives and criteria and that the contractor reapplies for renewal of accreditation.	

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DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities

The following Reference(s) have been cited in the attached DOE Order 5480.19, "Conduct of Operations Requirements for DOE Facilities", Compliance Assessments.

WHC-CM-1-1, *Management Policies*, Westinghouse Hanford Company, Richland, Washington.

WHC-SP-0708, *Westinghouse Hanford Company Conduct of Operations Manual - GOCO Cross Cultivation Committee - Operational Excellence Task Force*, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5480.19, "Conduct of Operations Requirements for DOE Facilities"	Mandatory
5.a.	Each DOE contractor shall use this Order and Attachment I in the review and development of existing and proposed directives, plans, or procedures relating to the conduct of operations at DOE facilities.	WHC-CM-1-1
5.b.	A graded approach shall be used in the application of the guidelines provided in Attachment I to assure that the depth of detail required and the magnitude of resources expended for operations are commensurate with each facility's programmatic importance and potential environmental, safety, and/or health impact.	WHC-SP-0708
5.c.[1]	Conformance with the requirements of this Order shall be documented.	WHC-CM-1-1
CHAPT.IX.C. 3.b.(3)(2)	When used as the sole means of preventing operation of an energy isolating device, Tagout devices, including their means of attachment shall, in addition to other requirements for their use, be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.	WHC-SP-0708
CHAPT.X.C.3.[4]a.[2]	To be independent, the integrity of the checks must be maintained by minimizing interaction between the personnel operating components and those performing the independent verifications.	WHC-SP-0708

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**DOE Order 5480.20, Personnel Selection, Qualification,
Training, and Staffing Requirements at DOE Reactor
and Non-reactor Nuclear Facilities**

The following Reference(s) have been cited in the attached DOE Order 5480.20, "Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities", Compliance Assessments.

WHC-CM-1-1, *Management Policies*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-2, *Organizations Charts and Charters*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-5, *Standard Operating Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-2-15, *Training Administration Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-1, *Emergency Plan*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-3, *Industrial Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-33, *Security Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-SP-0329, *400 Area Training Plans*, Westinghouse Hanford Company, Richland, Washington

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Criteria	DOE Order 5480.20, "Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities"	Mandatory
10.a.[1]	The requirements of this Order shall be implemented in accordance with the following: A Training Implementation Matrix shall be submitted to the cognizant field organization by November 8, 1991.	
10.a.[2]	The requirements of this Order shall be implemented in accordance with the following: The Training Implementation Matrix shall contain a schedule for implementing the requirements of this Order.	
10.b.	The requirements of this Order shall be implemented in accordance with the following: From the issue date of this Order until the Training Implementation Matrix is approved, all DOE reactor and non-reactor nuclear facilities shall continue to comply with the requirements contained in DOE 5480.5 and DOE 5480.6, as appropriate to the facility;	WHC-CM-1-3 WHC-CM-2-15 WHC-SP-0329
10.c.	The requirements of this Order shall be implemented in accordance with the following: Upon approval of the Training Implementation Matrix, personnel subsequently appointed to functional positions shall meet the education and experience requirements of this Order;	WHC-CM-2-15
10.d.	The requirements of this Order shall be implemented in accordance with the following: For facilities for which DOE 5480.18 is applicable, implementation of the training program content requirements of this Order may, for positions requiring accreditation, coincide with the implementation of DOE 5480.18.	
I. 2.[1]	The operating contractor shall establish an organization(s) within the line management organization that is responsible for the training of operating organization personnel.	WHC-CM-2-15
I. 2.[3]	The duties, responsibilities, qualifications, and authority of training organization personnel shall be documented, and managerial responsibilities and authority clearly defined.	WHC-CM-2-15 WHC-CM-1-3
I. 3. [1]	The operating organization shall establish qualification criteria for subcontractor personnel who replace personnel in the operating organization.	WHC-CM-2-15
I. 3. [2]	Subcontractor personnel shall meet the qualification requirements for the job function to be performed prior to active involvement in facility activities.	WHC-CM-2-15
I. 3. [3]	For subcontractor personnel who do not meet the requirements, work activities on safety-related structures, systems, and components identified in the facility Safety Analysis Report shall be supervised by a person who meets the qualification criteria established by the operating organization for conduct of such activities.	WHC-CM-2-15
I. 3. [4]	In addition, the operating organization shall ensure that subcontractor and temporary personnel who perform specialized activities such as radiation protection, maintenance, in-service inspection, radiography, and welding are qualified to perform their assigned tasks.	WHC-CM-2-15
I. 3.a.	This assurance shall be considered adequate with proper documentation of at least one of the following: The satisfactory result of an audit of subcontractor records which relate to qualification of the subcontractor personnel being considered for assignment by the operating organization;	WHC-CM-2-15
I. 3.b.	This assurance shall be considered adequate with proper documentation of at least one of the following: Operating organization's previous verification (within 2 years) of the ability of the subcontractor employee to perform assigned tasks safely and efficiently;	WHC-CM-2-15
I. 3.c.	This assurance shall be considered adequate with proper documentation of at least one of the following: Successful completion by the subcontractor employee of those segments of the operating organization's qualification program which are considered pertinent to accomplishment of the task to be performed.	WHC-CM-2-15
I. 4.a.[1]	The operating contractor shall have a process for selection and assignment of personnel into the operating organization.	WHC-CM-2-15

Criteria	DOE Order 5480.20, "Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities"	Mandatory
1. 5. [2]	Personnel at DOE reactor and non-reactor nuclear facilities shall possess qualifications which provide reasonable assurance that their decisions and actions will ensure that assigned responsibilities are conducted properly and safely.	WHC-CM-2-15
1. 5.a[1]	Operating organizations shall establish written procedures which clearly define qualification requirements for personnel in each functional level based on the criteria contained in this Order.	WHC-CM-2-15 WHC-CM-1-3
1. 5.a[2]	The shift in relative importance of managerial and technical competence shall be considered by management in establishing these requirements.	WHC-CM-2-15 WHC-CM-1-3
1. 5.b.	Qualification may be granted only after assuring that all requirements (including training and examinations as required) and other specified requirements...have been satisfactorily completed.	WHC-CM-2-15
1. 5.c.	Qualification shall be valid for a maximum of two years (unless revoked for cause) at which time the person shall be requalified in accordance with paragraph 10 of this Chapter.	WHC-CM-2-15
1. 6.a.	The program leading to certification shall be governed by written procedures which include requirements for documented assessment of the person's qualifications through examinations and operational evaluations.	WHC-CM-2-15
1. 6.b.[1]	Certification may be granted only after assuring that all qualification requirements (including written and oral examinations and operational evaluations) and other specified requirements...have been satisfactorily completed, and management has assured that the person is capable of safely performing all functions of the position.	WHC-CM-2-15
1. 6.b.[2]	Satisfactory completion of qualifications which result in certification shall be verified by a person or group other than the person or group that provided the training or the candidate's immediate supervisor.	WHC-CM-2-15
1. 6.b.[3]	Certification shall be valid for a maximum of two years (unless revoked for cause) at which time the person shall be recertified in accordance with paragraph 10 of this Chapter.	WHC-CM-2-15
1. 6.c.[1]	Reactor operators, senior reactor operators, and shift supervisors at DOE Category A and B reactors and fissionable material handlers and fissionable material handler supervisors at DOE non-reactor nuclear facilities shall be certified.	WHC-CM-2-15 WHC-SP-0329
1. 6.c.[2]	For all other operators and their immediate supervisors, the operating organization shall identify in the Training Implementation Matrix any additional positions that will be subject to certification....	WHC-CM-2-15 WHC-SP-0329
1. 7.a. [3]	Training programs shall consist of a combination of classroom-type and on- the-job training, and include simulator and laboratory training as it applies to the position.	WHC-CM-2-15
1. 7.a.(1)[1]	Qualification programs shall be reviewed by contractor facility management and kept up to date to reflect changes to the facility, procedures, regulations, and quality assurance requirements as well as applicable industry operating experience.	WHC-CM-1-1 WHC-CM-1-3
1. 7.a.(1)[2]	The concept of training personnel as a team, stressing team communications and interaction, shall be used where job functions require team solutions and activities.	
1. 7.a.(2)[1]	A Training Implementation Matrix which defines and describes the application of the selection, qualification, and training requirements of this Order shall be prepared by the operating organization.	
1. 7.a.(2)[2]	The Matrix shall clearly define the organization, planning, and administration of the qualification program and set forth the responsibility, authority, and methods for conducting training.	
1. 7.a.(2)[3]	Suitable justification for exceptions shall be included in the Matrix for any requirement not implemented.	
1. 7.a.(2)[4]	This Matrix shall be submitted to the Head of the Field Organization for approval.	

Criteria	DOE Order 5480.20, "Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities"	Mandatory
I. 7.b. [1]	Initial and continuing training programs shall be implemented to ensure that operating organization personnel are qualified to perform job requirements.	WHC-CM-2-15
I. 7.c. [1]	An initial training program shall be established for operating organization personnel to develop or enhance their knowledge, skills, and ability to perform job assignments.	WHC-CM-2-15
I. 7.c. [2]	Personnel in training shall not independently make decisions or take actions that could affect facility safety, nor shall personnel in training be placed in such positions.	WHC-CM-2-15
I. 7.d.	Continuing training programs shall be designed and implemented to maintain and enhance the proficiency of operating organization personnel who perform functions associated with safety-related structures, systems, and components identified in the facility Safety Analysis Report.	WHC-CM-2-15
I. 7.d.(1)	These programs shall be structured commensurate with specific position needs, and shall be administered on a biennial cycle.	WHC-CM-2-15
I. 7.d.(2)	Periodic written and oral examinations and/or operational evaluations shall be administered and documented throughout the cycle on material included in the training programs.	WHC-CM-2-15
I. 7.d.(3)	Training and examination covering abnormal facility procedures and emergencies shall be required at least annually for certified operations personnel.	WHC-CM-2-15
I. 7.d.(4)(a)	Continuing training programs for certified operations personnel shall consist of preplanned classroom-type training, on-the-job training, and operational evaluations on a regular and continuing basis, and shall include, as a minimum, the following as related to job performance: Training in significant facility system and component changes, applicable procedure changes, applicable industry operating experience, selected fundamentals with emphasis on seldom used knowledge and skills necessary to assure safety, and other training as needed to correct identified performance problems;	WHC-CM-2-15
I. 7.d.(4)(b)	Continuing training programs for certified operations personnel shall consist of preplanned classroom-type training, on-the-job training, and operational evaluations on a regular and continuing basis, and shall include, as a minimum, the following as related to job performance: Drills shall be conducted in the facility to enable personnel and operating teams to maintain proficiency in their ability to respond to abnormal or accident situations;	WHC-CM-4-1 WHC-CM-1-5
I. 7.d.(4)(c)[1]	Continuing training programs for certified operations personnel shall consist of preplanned classroom-type training, on-the-job training, and operational evaluations on a regular and continuing basis, and shall include, as a minimum, the following as related to job performance: Instruction in the use of facility systems to control or mitigate accidents.	WHC-CM-2-15
I. 7.d.(4)(c)[2]	Continuing training programs for certified operations personnel shall consist of preplanned classroom-type training, on-the-job training, and operational evaluations on a regular and continuing basis, and shall include, as a minimum, the following as related to job performance: Such training shall include both classroom-type training and training conducted in the facility;	WHC-CM-2-15
I. 7.d.(4)(d)1	Continuing training programs for certified operations personnel shall consist of preplanned classroom-type training, on-the-job training, and operational evaluations on a regular and continuing basis, and shall include, as a minimum, the following as related to job performance: Training, as applicable to the position, in the following subjects where examinations and experience (industry and facility-specific) or other evidence indicates emphasis in scope and depth of coverage is needed: Theory and principles of facility operation;	WHC-CM-2-15

Criteria	DOE Order 5480.20, "Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities"	Mandatory
1. 7.d.(4)(d)2	Continuing training programs for certified operations personnel shall consist of preplanned classroom-type training, on-the-job training, and operational evaluations on a regular and continuing basis, and shall include, as a minimum, the following as related to job performance: Training, as applicable to the position, in the following subjects where examinations and experience (industry and facility-specific) or other evidence indicates emphasis in scope and depth of coverage is needed: General and specific facility operating characteristics;	WHC-CM-2-15
1. 7.d.(4)(d)3	Continuing training programs for certified operations personnel shall consist of preplanned classroom-type training, on-the-job training, and operational evaluations on a regular and continuing basis, and shall include, as a minimum, the following as related to job performance: Training, as applicable to the position, in the following subjects where examinations and experience (industry and facility-specific) or other evidence indicates emphasis in scope and depth of coverage is needed: Facility instrumentation and control;	WHC-CM-2-15
1. 7.d.(4)(d)4	Continuing training programs for certified operations personnel shall consist of preplanned classroom-type training, on-the-job training, and operational evaluations on a regular and continuing basis, and shall include, as a minimum, the following as related to job performance: Training, as applicable to the position, in the following subjects where examinations and experience (industry and facility-specific) or other evidence indicates emphasis in scope and depth of coverage is needed: Facility protection systems;	WHC-CM-2-15
1. 7.d.(4)(d)5	Continuing training programs for certified operations personnel shall consist of preplanned classroom-type training, on-the-job training, and operational evaluations on a regular and continuing basis, and shall include, as a minimum, the following as related to job performance: Training, as applicable to the position, in the following subjects where examinations and experience (industry and facility-specific) or other evidence indicates emphasis in scope and depth of coverage is needed: Engineered Safety Features;	WHC-CM-2-15
1. 7.d.(4)(d)6	Continuing training programs for certified operations personnel shall consist of preplanned classroom-type training, on-the-job training, and operational evaluations on a regular and continuing basis, and shall include, as a minimum, the following as related to job performance: Training, as applicable to the position, in the following subjects where examinations and experience (industry and facility-specific) or other evidence indicates emphasis in scope and depth of coverage is needed: Normal, abnormal, and emergency procedures;	WHC-CM-2-15
1. 7.d.(4)(d)7	Continuing training programs for certified operations personnel shall consist of preplanned classroom-type training, on-the-job training, and operational evaluations on a regular and continuing basis, and shall include, as a minimum, the following as related to job performance: Training, as applicable to the position, in the following subjects where examinations and experience (industry and facility-specific) or other evidence indicates emphasis in scope and depth of coverage is needed: Radiation control and safety;	WHC-CM-2-15
1. 7.d.(4)(d)8	Continuing training programs for certified operations personnel shall consist of preplanned classroom-type training, on-the-job training, and operational evaluations on a regular and continuing basis, and shall include, as a minimum, the following as related to job performance: Training, as applicable to the position, in the following subjects where examinations and experience (industry and facility-specific) or other evidence indicates emphasis in scope and depth of coverage is needed: Technical Specifications/Operational Safety Requirements.	WHC-CM-2-15
1. 7.e.(1)(a)	All persons employed either full- or part-time in DOE reactor and non-reactor nuclear facilities shall be trained in the following areas commensurate with their job duties: General description of facilities;	WHC-CM-2-15
1. 7.e.(1)(b)	All persons employed either full- or part-time in DOE reactor and non-reactor nuclear facilities shall be trained in the following areas commensurate with their job duties: Job related policies, procedures, and instructions;	WHC-CM-2-15
1. 7.e.(1)(c)	All persons employed either full- or part-time in DOE reactor and non-reactor nuclear facilities shall be trained in the following areas commensurate with their job duties: Radiological health and safety program;	WHC-CM-2-15
1. 7.e.(1)(d)	All persons employed either full- or part-time in DOE reactor and non-reactor nuclear facilities shall be trained in the following areas commensurate with their job duties: Facility emergency plans;	WHC-CM-2-15

Criteria	DOE Order 5480.20, "Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities"	Mandatory
I. 7.e.(1)(e)	All persons employed either full- or part-time in DOE reactor and non-reactor nuclear facilities shall be trained in the following areas commensurate with their job duties: Industrial safety/hygiene program;	WHC-CM-2-15
I. 7.e.(1)(f)	All persons employed either full- or part-time in DOE reactor and non-reactor nuclear facilities shall be trained in the following areas commensurate with their job duties: Fire protection program;	WHC-CM-2-15
I. 7.e.(1)(g)	All persons employed either full- or part-time in DOE reactor and non-reactor nuclear facilities shall be trained in the following areas commensurate with their job duties: Security program;	WHC-CM-2-15
I. 7.e.(1)(h)	All persons employed either full- or part-time in DOE reactor and non-reactor nuclear facilities shall be trained in the following areas commensurate with their job duties: Quality assurance program;	WHC-CM-2-15
I. 7.e.(2)[1]	Visitors, contracted personnel, and temporary personnel shall be under continuous escort while at the facility unless they have been trained in appropriate areas from the above list to the extent necessary to ensure safe execution of their duties.	WHC-CM-2-15 WHC-CM-4-33
I. 7.e.(3)[3]	Persons who do not pass this examination shall not be permitted access without a continuous escort.	WHC-CM-2-15
I. 7.e.(4)	GET shall be included in continuing training programs for all facility personnel, and examinations administered at least every two years.	WHC-CM-2-15
I. 7.f.	For those facilities for which a PRA has been performed, initial and continuing training programs for operations and technical support personnel shall include training on the principal results of the PRA.	WHC-CM-2-15
I. 7.f.(1)	This training shall address the following: The importance of facility systems in preventing damage or severe accidents;	WHC-CM-2-15
I. 7.f.(2)	This training shall address the following: Locations of all significant amounts of radioactive and other hazardous materials, and measures to prevent its release;	WHC-CM-2-15
I. 7.f.(3)	This training shall address the following: The importance of maintaining operational limits and conditions, and the consequences of violating those limits.	WHC-CM-2-15
I. 7.g.(1)	All technicians and maintenance personnel shall be qualified to perform the tasks associated with their specialty, or work under the direct supervision of personnel qualified to perform the activity or task.	WHC-CM-2-15
I. 7.g.(2) [1]	Training on safety-related systems identified in the facility Safety Analysis Report shall be conducted for personnel who perform work on those systems/components.	WHC-CM-2-15
I. 7.g.(2)(a)	System training shall, at a minimum, include the following elements: Purpose of the system;	WHC-CM-2-15
I. 7.g.(2)(b)	System training shall, at a minimum, include the following elements: General description of the system including major components, relationship to other systems, and all safety implications associated with working on the system;	WHC-CM-2-15
I. 7.g.(2)(c)	System training shall, at a minimum, include the following elements: Related industry and facility-specific experience.	WHC-CM-2-15
I. 7.h.(1)	Training shall be provided to entry-level personnel who provide technical support to the operating organization.	WHC-CM-2-15
I. 7.h.(2)	The contractor shall develop a list of specific technical support personnel positions that may have direct impact on employee, facility, or public safety.	
I. 7.h.(2)(a)	Training in the following facility- specific subject areas shall be included as appropriate to the position: Facility organization;	WHC-CM-2-15

Criteria	DOE Order 5480.20, "Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities"	Mandatory
1. 7.h.(2)(b)1	Training in the following facility- specific subject areas shall be included as appropriate to the position: Facility fundamentals; Heat transfer, fluid flow, and thermodynamics	WHC-CM-2-15
1. 7.h.(2)(b)2	Training in the following facility- specific subject areas shall be included as appropriate to the position: Facility fundamentals; Electrical science	WHC-CM-2-15
1. 7.h.(2)(b)3	Training in the following facility -specific subject areas shall be included as appropriate to the position: Facility fundamentals; Nuclear physics	WHC-CM-2-15
1. 7.h.(2)(b)4	Training in the following facility- specific subject areas shall be included as appropriate to the position: Facility fundamentals; Chemistry/chemistry controls	WHC-CM-2-15
1. 7.h.(2)(b)5	Training in the following facility- specific subject areas shall be included as appropriate to the position: Process controls	WHC-CM-2-15
1. 7.h.(2)(c)	Training in the following facility- specific subject areas shall be included as appropriate to the position: Facility systems, components, and operations;	WHC-CM-2-15
1. 7.h.(2)(d)	Training in the following facility- specific subject areas shall be included as appropriate to the position: Simulator training;	
1. 7.h.(2)(e)	Training in the following facility- specific subject areas shall be included as appropriate to the position: Environment, Safety, and Health Orders;	
1. 7.h.(2)(f)	Training in the following facility- specific subject areas shall be included as appropriate to the position: Codes and standards overview;	
1. 7.h.(2)(g)	Training in the following facility- specific subject areas shall be included as appropriate to the position: Facility document system;	
1. 7.h.(2)(h)	Training in the following facility- specific subject areas shall be included as appropriate to the position: Safety Analysis Reports and Technical Specifications/Operational Safety Requirements;	WHC-CM-2-15
1. 7.h.(2)(i)	Training in the following facility- specific subject areas shall be included as appropriate to the position: Nuclear criticality control;	WHC-CM-2-15
1. 7.h.(2)(j)	Training in the following facility- specific subject areas shall be included as appropriate to the position: Material, maintenance, and modification control;	WHC-CM-2-15
1. 7.h.(2)(k)	Training in the following facility- specific subject areas shall be included as appropriate to the position: ALARA and radwaste reduction program;	WHC-CM-1-1
1. 7.h.(2)(l)	Training in the following facility- specific subject areas shall be included as appropriate to the position: QA/QC practices.	WHC-CM-2-15
1. 7.i. [1]	In addition to the training specified in paragraph 7h, managers and first line supervisors shall receive training in the following as appropriate to their job responsibilities.	WHC-CM-2-15
1. 7.i.(1)(a)	The supervisory skills training program shall include: Leadership;	WHC-CM-2-15
1. 7.i.(1)(b)	The supervisory skills training program shall include: Interpersonal communication;	WHC-CM-2-15
1. 7.i.(1)(c)	The supervisory skills training program shall include: Command responsibilities and limits;	WHC-CM-2-15
1. 7.i.(1)(d)	The supervisory skills training program shall include: Motivation of personnel;	WHC-CM-2-15
1. 7.i.(1)(e)	The supervisory skills training program shall include: Problem analysis and decision making;	WHC-CM-2-15

Criteria	DOE Order 5480.20, "Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities"	Mandatory
1. 7.i.(1)(f)	The supervisory skills training program shall include: Fitness for duty procedures;	WHC-CM-1-3
1. 7.i.(1)(g)	The supervisory skills training program shall include: Administrative policies and procedures.	WHC-CM-2-15
1. 8. [1]	Written and oral examinations and operational evaluations shall be prepared and administered to demonstrate that certified operators and supervisors possess the required knowledge and skills.	WHC-CM-2-15
1. 8. [2]	Written examinations and operational evaluations shall be prepared and administered for the qualification of other operators and supervisors.	WHC-CM-2-15
1. 8.a.[1]	Written procedures shall be established for written and oral examinations and operational evaluations (as required).	WHC-CM-2-15
1. 8.a.[2]	These procedures shall address examination/evaluation development, approval, security, administration, and maintenance of examination question banks.	WHC-CM-2-15
1. 8.b.[2]	The oral examination content shall be tailored to evaluate the candidate's operational knowledge (initial/continuing training program subjects) and organizational awareness to determine how the individual will function in an operating environment.	WHC-CM-2-15
1. 8.b.[3]	Oral examination questions, the candidate's response, and the evaluation by the examiner(s) of that response shall be documented.	WHC-CM-2-15
1. 9.[1]	Reexaminations for certified and qualified operators and supervisors shall include subjects in which the person is expected to be proficient and emphasize those subjects covered by the continuing training program.	WHC-CM-2-15
1. 9.[2]	The contractor shall administer biennial written and oral examinations and operational evaluations, or administer periodic examinations throughout the cycle that cover all continuing training program subjects/ elements.	WHC-CM-2-15
1.10.[1]	Employees shall not be allowed to function as qualified/certified operators and supervisors if they have not completed all of the requalification program elements within two years.	WHC-CM-2-15
1.10.[2]	If an operator or supervisor fails a requalification examination, or shows serious job performance deficiencies which indicate that he or she may perform in an unsafe manner, the person shall be removed from activities requiring qualification.	WHC-CM-2-15
1.10.a.(1)	In addition, recertification of operators and supervisors shall be based on the following: A review of individual operating performance during the past certification period by either line management, by a committee, or by a person designated by management;	WHC-CM-2-15
1.10.a.(2)	In addition, recertification of operators and supervisors shall be based on the following: A current medical examination as required by Chapter II paragraph 3, Chapter III paragraph 3, or Chapter IV paragraph 3.	WHC-CM-1-3 WHC-CM-2-15
1.10.b.[1]	When a certified operator or supervisor has been absent from certification duties for greater than 3 months, but less than 12 months, selected retraining (including written and oral examinations and operational evaluations) shall be given as deemed necessary prior to reassignment to certification duties.	WHC-CM-2-15
1.10.b.[3]	However, if the absence is greater than 12 months, comprehensive written and oral examinations and operational evaluations (as required of initial candidates) shall be given to determine weak areas.	WHC-CM-2-15
1.10.b.[4]	Retraining and reexamination shall be required in areas of weakness, and upon successful completion, a new certification date may be established.	WHC-CM-2-15
1.11. [4]	In all cases, the requisite examinations to establish qualification shall be completed.	WHC-CM-2-15
1.11.a.[1]	The operating organization shall establish procedures and criteria to administer and document exceptions to initial and continuing training program requirements.	WHC-CM-2-15

Criteria	DOE Order 5480.20, "Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities"	Mandatory
I.11.a.(2)	The name of the person and the specific subject for which the exception is requested, along with justification for the exception, shall be included as part of the documentation.	WHC-CM-2-15
I.11.a.(3)	In all cases, the operating organization shall ensure that sufficient facility-specific instruction is provided to enable the candidate to perform job requirements.	WHC-CM-2-15
I.11.a.(4)	The operating organization shall submit the procedure(s) which detail the criteria for granting an exception to the field organization for approval.	
I.11.b.	Any exception from certification or qualification requirements shall be approved by contractor management.	WHC-CM-2-15
I.12.a.	The operating organization shall establish an administrative procedure which addresses extensions to ensure timely completion of requirements associated with certification or qualification.	WHC-CM-2-15
I.12.b.(1)	Extensions of certification of operators and supervisors shall be approved by the field organization.	
I.12.b.(2)	Extensions of qualification of other personnel shall be approved by contractor facility management.	WHC-CM-2-15
I.13.(3)	Persons who do not possess the formal educational requirements specified shall not be automatically eliminated where other factors provide sufficient assurance of their abilities to fulfill the duties of a specific position.	WHC-CM-1-2
I.13.(4)	These factors shall be evaluated on a case-by-case basis and approved and documented by the operating organization.	WHC-CM-1-2
I.14.a.(2)	Formal education shall not be allowed to substitute for more than 50 percent of the experience requirement unless otherwise stated in Chapters II, III, or IV.	WHC-CM-1-2
I.15.	Administrative procedures shall be developed and implemented to limit the working hours of operating organization personnel who perform safety-related functions....	WHC-CM-4-3
I.15.a.	Adequate shift coverage shall be maintained without heavy use of overtime.	WHC-CM-4-3
I.15.a.(1)	However, in the event that unforeseen problems require substantial amounts of overtime to be used..., the following requirements shall be applied on a temporary basis: A person shall not be permitted to work more than 16 consecutive hours, excluding shift turnover time;	WHC-CM-4-3
I.15.a.(2)	However, in the event that unforeseen problems require substantial amounts of overtime to be used..., the following requirements shall be applied on a temporary basis: A person shall not be permitted to work more than 24 hours in any 48 hour period, excluding shift turnover time;	WHC-CM-4-3
I.15.a.(3)	However, in the event that unforeseen problems require substantial amounts of overtime to be used..., the following requirements shall be applied on a temporary basis: A person shall not be permitted to work more than 72 hours in any 7-day period, excluding shift turnover time;	WHC-CM-4-3
I.15.a.(4)	However, in the event that unforeseen problems require substantial amounts of overtime to be used..., the following requirements shall be applied on a temporary basis: A person shall not be permitted to work more than 14 consecutive days without having two consecutive days off;	WHC-CM-4-3
I.15.a.(5)	However, in the event that unforeseen problems require substantial amounts of overtime to be used..., the following requirements shall be applied on a temporary basis: Except during extended shutdown periods, brief pre- or post-shift training sessions, or weather-related occurrences, the use of overtime shall be considered on an individual basis and not for the entire shift crew.	WHC-CM-4-3
I.15.b.(1)	Any deviation from the overtime requirements shall be authorized on a case-by-case basis in advance by the Plant/Facility Manager or his or her designee in accordance with established procedures and with documentation of the basis for granting the deviation.	WHC-CM-4-3

Criteria	DOE Order 5480.20, "Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities"	Mandatory
I.15.b.(2)	Individual overtime shall be reviewed monthly by the Plant/Facility Manager or his or her designee to assure that excessive hours have not been worked.	WHC-CM-4-3
I.16.	Contractors shall develop and implement administrative procedures that specify requirements for the maintenance of training, qualification, and certification records for operating organization personnel.	WHC-CM-2-15
I.16.a.	Qualification and certification of personnel shall be documented in an easily auditable format.	WHC-CM-2-15
I.16.a.(1)	Individual record documentation shall include: Education, experience, and employment history and most recent health evaluation summary (e.g., NRC Form 396);	WHC-CM-2-15
I.16.a.(2)	Individual record documentation shall include: Training programs completed and qualification/certification achieved;	WHC-CM-2-15
I.16.a.(3)[1]	Individual record documentation shall include: Latest completed checklists, graded written examinations (with answers corrected as necessary or examination keys), simulator examinations (where applicable), and operational evaluations used for qualification/certification.	WHC-CM-2-15
I.16.a.(4)	Individual record documentation shall include: Lists of questions asked and the examiner's overall evaluation of the operator/supervisor's responses on oral examinations;	WHC-CM-2-15
I.16.a.(5)	Individual record documentation shall include: Correspondence relating to exceptions to training requirements and extensions of qualification/ certification;	WHC-CM-2-15
I.16.a.(6)	Individual record documentation shall include: Records of qualification for one-time-only special tests or operations;	
I.16.a.(7)	Individual record documentation shall include: Attendance records for required training courses or sessions.	WHC-CM-2-15
I.16.b.(1)	A historical record that documents initial qualification or certification, and applicable information from the above list that verifies the most recent qualification or certification shall be retained in individual records.	WHC-CM-2-15
IV.2.a.(1)	Prior to assuming the duties of the assigned position, persons at the manager level shall meet the following requirements: Education: Baccalaureate in engineering or related science	WHC-CM-2-15
IV.2.a.(2)	Prior to assuming the duties of the assigned position, persons at the manager level shall meet the following requirements: Experience: Nuclear; 4 years	WHC-CM-2-15
IV.2.a.(3)(a)[1]	Prior to assuming the duties of the assigned position, persons at the manager level shall meet the following requirements: Special Requirements: Education or experience that is job-related may be substituted for a degree on a case-by-case basis.	
IV.2.a.(3)(b)	Managers shall receive facility-specific training based upon a comparison of the individual's background and abilities with the responsibilities and duties of the position;	WHC-CM-2-15
IV.2.a.(3)(c)	The Training Manager shall have a baccalaureate including courses in education and technical subjects (baccalaureate need not be in engineering or related science).	WHC-CM-2-15
IV.2.b.(1)	Prior to assuming the duties of the assigned position, supervisors shall meet the following requirements: Education: High School Diploma	WHC-CM-2-15
IV.2.b.(2)	Prior to assuming the duties of the assigned position, supervisors shall meet the following requirements: Experience: Nuclear; 3 years	WHC-CM-2-15
IV.2.b.(3)	Prior to assuming the duties of the assigned position, supervisors shall meet the following requirements: Special Requirement: Full-time academic training may be substituted on a one-for-one basis for 2 of the 3 years of required nuclear experience.	

Criteria	DOE Order 5480.20, "Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities"	Mandatory
IV.3.[1]	For each type of operation, the operating organization shall determine the physical demands imposed upon certified personnel by the job tasks that are required to perform both routine and emergency functions.	WHC-CM-1-3 WHC-CM-2-15
IV.3.[2]	A medical examination shall be given to prospective employees and a reexamination shall be given at least every two years to certified operators, fissionable material handlers, and supervisors to verify health and physical fitness to safely perform their assigned tasks.	WHC-CM-1-3
IV.3.[4]	Medical examination requirements for other operating organization personnel shall be in accordance with the procedures of the operating contractor.	WHC-CM-1-3
IV.4. [1]	The operating organization shall ensure that minimum staffing requirements are met for safe and reliable operations.	
IV.4.a.[1]	Overall staffing shall be based on the facility Safety Analysis Report and Operational Safety Requirements.	
IV.4.a.[2]	Facility operation shall be contingent upon meeting the criteria contained in these documents.	
IV.4.b.	A list of facility personnel by name, title, and work and home telephone numbers shall be readily available in the control room or other appropriate central location within the facility for use by the operating crew.	
IV.4.b.(1)	The list shall include: Management personnel;	
IV.4.b.(2)	The list shall include: Radiation safety personnel;	
IV.4.b.(3)	The list shall include: Technical support personnel.	
IV.5.a.	Individual operator training shall be sufficiently comprehensive to cover areas which are fundamental to the candidate's assigned tasks.	WHC-CM-2-15
IV.5.a.(1)[1]	A core of subjects such as industrial safety, instrumentation and control, basic physics, chemistry, industry operating experience, and major facility systems shall be established.	WHC-CM-2-15
IV.5.a.(2)	On-the-job and classroom-type training shall be included to assure that personnel are familiar with all aspects of their positions.	WHC-CM-2-15
IV.5.a.(2)(a)	Such training shall include but not be limited to: Normal procedures;	WHC-CM-2-15
IV.5.a.(2)(b)	Such training shall include but not be limited to: Emergency actions;	WHC-CM-2-15
IV.5.a.(2)(c)	Such training shall include but not be limited to: Radiation control practices;	WHC-CM-2-15
IV.5.a.(2)(d)	Such training shall include but not be limited to: Location and functions of pertinent safety systems and equipment;	WHC-CM-2-15
IV.5.a.(2)(e)	Such training shall include but not be limited to: Configuration control procedures;	WHC-CM-2-15
IV.5.a.(2)(f)	Such training shall include but not be limited to: Procedures for making changes or alterations in operations;	WHC-CM-2-15
IV.5.a.(2)(g)	Such training shall include but not be limited to: Operational Safety Requirements.	WHC-CM-2-15
IV.5.b.(1)	Fissionable materials handler candidates shall be trained in the following subject areas in addition to that required in subparagraph 5a above to the extent applicable to the position: Instrumentation and control, including types of instruments and control systems, principles of operation, and consequences of malfunctions;	WHC-CM-2-15
IV.5.b.(2)	Fissionable materials handler candidates shall be trained in the following subject areas in addition to that required in subparagraph 5a above to the extent applicable to the position: Facility operating characteristics, including principal features, operating parameters, and operating limits of the facility (to include auxiliary systems);	WHC-CM-2-15

Criteria	DOE Order 5480-20, "Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-reactor Nuclear Facilities"	Mandatory
IV.5.b.(3)	Fissionable materials handler candidates shall be trained in the following subject areas in addition to that required in subparagraph 5a above to the extent applicable to the position: Principles of nuclear facility operation, including the processes involved and technical terminology for the chemical, physical, and metallurgical reactions and criticality safety principles, controls, and specifications.	WHC-CM-2-15
IV.5.c. [1]	The supervisor training program shall include the categories and on-the-job training specified for operators and fissionable material handlers to the extent to which they are applicable.	WHC-CM-2-15
IV.5.c. [2]	This training shall be of increased depth to reflect the added responsibility of the supervisor position.	WHC-CM-2-15
IV.5.c.(1)	In addition, the supervisor training program shall include the following to the extent that it is applicable to job requirements: Design, control, and operating limitations for the facility, including instrumentation characteristics and adjustment, facility operation, facility console control mechanisms, and control room manipulations;	WHC-CM-2-15
IV.5.c.(2)	In addition, the supervisor training program shall include the following to the extent that it is applicable to job requirements: Procedures for making design and operating changes, including changes in operating procedures;	WHC-CM-2-15
IV.5.c.(3)	In addition, the supervisor training program shall include the following to the extent that it is applicable to job requirements: Radiation hazards which may arise during the performance of experiments;	WHC-CM-2-15
IV.5.c.(4)	In addition, the supervisor training program shall include the following to the extent that it is applicable to job requirements: Nuclear and radiation theory, including details of the fission process, neutron multiplication, source effects, and neutron poison effects;	WHC-CM-2-15
IV.5.c.(5)	In addition, the supervisor training program shall include the following to the extent that it is applicable to job requirements: Specific operating characteristics of the facility, such as causes and effects of temperature and pressure changes;	WHC-CM-2-15
IV.5.c.(6)	In addition, the supervisor training program shall include the following to the extent that it is applicable to job requirements: Procedures and limitations involved in initial equipment loading, alterations in fissionable material configuration, and determination of various internal and external effects on criticality safety;	WHC-CM-2-15
IV.5.c.(7)	In addition, the supervisor training program shall include the following to the extent that it is applicable to job requirements: Procedures, equipment, and facilities available for handling and disposing of radioactive materials and effluents;	WHC-CM-2-15
IV.5.c.(8)	In addition, the supervisor training program shall include the following to the extent that it is applicable to job requirements: Functions, assignments, and responsibilities of the maintenance organization as related to facility safety;	WHC-CM-2-15
IV.5.c.(9)	In addition, the supervisor training program shall include the following to the extent that it is applicable to job requirements: Applicable portions of the facility Safety Analysis Report.	WHC-CM-2-15
IV.6. [2]	The operating organization shall establish procedures which define requirements and frequency...necessary to maintain an active status.	WHC-CM-2-15
IV.6. [3]	If established proficiency requirements are not met, certification shall be suspended and the person shall not be assigned certification duties until certification is regained.	WHC-CM-2-15
IV.6. [5]	If the facility is infrequently operated, certification shall be reinstated prior to facility operation by administering written and oral examinations to ensure adequate operational knowledge.	WHC-CM-2-15

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DOE Order 5480.21, Unreviewed Safety Questions

The following Reference(s) have been cited in the attached DOE Order 5480.21, "Unreviewed Safety Questions", Compliance Assessments.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

Implementation Plan for DOE Orders 5480.21, .22, and .23, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5480.21, "Unreviewed Safety Questions"	Mandatory
10.a.(1)	A contractor authorized to operate DOE nuclear facilities shall: Perform all safety evaluations required by paragraph (b) of this section to determine whether a situation involves USQ;	WHC-CM-1-3
10.a.(2)	A contractor authorized to operate DOE nuclear facilities shall: Prior to implementation of a proposed action, obtain PSO approval for situations determined to involve a USQ or a Technical Safety Requirements (TSR) change;	WHC-CM-1-3
10.a.(3)	A contractor authorized to operate DOE nuclear facilities shall: Develop and implement procedures to govern the need for, and the performance of, safety evaluations under this section.	WHC-CM-1-3
10.b.(1)	A safety evaluation shall be performed for: Temporary or permanent changes in the facility as described in the existing safety analyses;	WHC-CM-1-3
10.b.(2)	A safety evaluation shall be performed for: Temporary or permanent changes in the procedures as described in existing safety analyses;	WHC-CM-1-3
10.b.(3)	A safety evaluation shall be performed for: Test or experiments not described in existing safety analyses.	WHC-CM-1-3
10.c.(1)	A situation involves a USQ if: The probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the facility safety analyses could be increased;	WHC-CM-1-3
10.c.(2)	A situation involves a USQ if: The possibility for an accident or malfunction of a different type than any evaluated previously in the facility safety analyses could be created;	WHC-CM-1-3
10.c.(3)	A situation involves a USQ if: Any margin of safety, as defined in the bases of the TSRs, could be reduced.	WHC-CM-1-3
10.d.(1)	When a contractor identifies information that indicates a potential inadequacy of previous safety analyses or a possible reduction in the margin of safety as defined in the TSRs, the contractor shall: Notify the PSO of the situation upon discovery of the information;	WHC-CM-1-3
10.d.(2)	When a contractor identifies information that indicates a potential inadequacy of previous safety analyses or a possible reduction in the margin of safety as defined in the TSRs, the contractor shall: Make an evaluation in accordance with paragraphs 10a and 10c;	WHC-CM-1-3
10.d.(3)	When a contractor identifies information that indicates a potential inadequacy of previous safety analyses or a possible reduction in the margin of safety as defined in the TSRs, the contractor shall: Take action to place the facility in a safe condition until the safety evaluation is completed;	WHC-CM-1-3
10.d.(4)	When a contractor identifies information that indicates a potential inadequacy of previous safety analyses or a possible reduction in the margin of safety as defined in the TSRs, the contractor shall: Submit the completed safety evaluation prior to removing any operational restrictions initiated pursuant to paragraph 10d(2).	WHC-CM-1-3
10.e.(1)	For all safety evaluations required under this section, a contractor shall: Document the basis for the USQ determination, utilizing the procedures provided for in paragraph 10a(3) of this section and the criteria of paragraph 10c;	WHC-CM-1-3

Criteria	DOE Order 5480.21, "Unreviewed Safety Questions"	Mandatory
10.e.(2)	For all safety evaluations required under this section, a contractor shall: Maintain documentation required by paragraph 10e(1) for the authorized operating period of the nuclear facility and ensure the complete transfer of all documentation to any subsequent contractor prior to termination of its contract;	WHC-CM-1-3
10.e.(3)	For all safety evaluations required under this section, a contractor shall: Incorporate in the existing SAR, any changes that are needed as a result of the safety evaluation or any action taken;	WHC-CM-1-3
10.e.(4)	For all safety evaluations required under this section, a contractor shall: Submit to the PSO, on a schedule corresponding to the periodic updates of the SAR, a report summarizing all situations for which a safety evaluation was required by this section and indicating all "changes" considered in a safety evaluation and implemented 6 months or more before the submittal date of the report.	WHC-CM-1-3
Ch.II.1.b.[1]	All changes to a nuclear facility require analysis, but those that may affect the authorization basis require completion of a safety evaluation in accordance with this Order.	WHC-CM-1-3
Ch.II.1.b.[2]	Therefore, changes to nonsafety-related systems must be evaluated and may be determined to involve a USQ.	WHC-CM-1-3
Ch.II.2.a.[1]	This Order only requires safety evaluations for changes to a nuclear facility that alter the design, function, or method of performing the function of a structure, system, or component (SSC) described in the safety analyses either by test, drawing, or other information relied upon as the authorization basis.	WHC-CM-1-3
Ch.II.2.a.[2]	If the SSC is part of a larger SSC described in the safety analyses, and if the change alters the design, function, or method of performing the function of the larger SSC as described in the safety analyses, then a safety evaluation is required.	WHC-CM-1-3
Ch.II.2.b.[1]	Routine maintenance activities do not require review under this Order, except for those activities that are not enveloped by current analyses or might violate a Technical Safety Requirement (TSR).	WHC-CM-1-3
Ch.II.2.c.	Understanding the term "change" as it applies to modes of operation or facility processes is also important. For example, when a facility is designed to accommodate several nuclear processes but must modify equipment line-up to accommodate another process, this change in the equipment line-up does not constitute a change under this Order if the change is performed in accordance with approved procedures and was considered within the authorization basis of the facility.	WHC-CM-1-3
Ch.II.2.d.[2]	However, it is possible that some changes can be justified as not requiring evaluations under this Order, provided screening criteria are developed that will ensure that there are no indirect or secondary effects of the change.	WHC-CM-1-3
Ch.II.3.a.	Finally, changes to procedures that are outlined, summarized, or described must be evaluated in accordance with this Order if the outline, summary, or description in the safety analyses are impacted.	WHC-CM-1-3
Ch.II.3.b.	Procedures are not limited to those items specifically identified as procedure type (e.g., operating, chemistry, system, test, surveillance, and emergency plan) but could include anything described in the safety analyses that defines or describes activities or controls over the conduct of work. If changes to these activities or controls are made, such changes qualify as changes to procedures as described in the safety analyses, and the changes must be evaluated.	WHC-CM-1-3
Ch.II.4.[1]	Written safety evaluations are required for tests or experiments not described in safety analyses or other approved documentation that provide the authorization basis of the nuclear facility.	WHC-CM-1-3

Criteria	DOE Order 5480.21, "Unreviewed Safety Questions"	Mandatory
Ch.II.4.[2]	However, one-of-a-kind tests used to measure the effectiveness of new techniques or a new system configuration that might affect systems important to safety will require evaluation before they can be conducted.	WHC-CM-1-3
Ch.II.5.a.	Written safety evaluations are required for instances where discovery of an analytic error, omission, or inadequacy present the potential for an Unreviewed Safety Question.	WHC-CM-1-3
Ch.II.5.b.(1)	Because an analytical error, omission, or inadequacy as specified above has the potential for calling into question information relied upon for authorization of operations, DOE requires the following: the contractor shall immediately notify the PSO;	WHC-CM-1-3
Ch.II.5.b.(2)	Because an analytical error, omission, or inadequacy as specified above has the potential for calling into question information relied upon for authorization of operations, DOE requires the following: shall take steps assuring that operation is conducted in a mode or manner within the authorization basis, despite the analytic discrepancy;	WHC-CM-1-3
Ch.II.5.b.(3)	Because an analytical error, omission, or inadequacy as specified above has the potential for calling into question information relied upon for authorization of operations, DOE requires the following: the contractor shall complete a safety evaluation and submit it to the PSO prior to removing any operational restrictions implemented to compensate for the analytical discrepancy.	WHC-CM-1-3
Ch.II.5.c.	If a USQ is determined to be present, this safety evaluation will require not only DOE review but DOE approval, prior to removing any operational restrictions.	WHC-CM-1-3
Ch.III.1.b.[1]	First, each facility must identify the methods by which facility changes can be made (i.e., are changes made under a modification process, nonconformance processes, maintenance processes, etc.).	WHC-CM-1-3
Ch.III.1.b.[2]	After these methods have been identified, each facility must determine what constitutes an acceptable means to make a change. That is, the contractor must clearly control the facility change process and must perform and document changes in accordance with approved procedures.	WHC-CM-1-3
Ch.III.1.c.	Second, in order to determine what constitutes a USQ, an understanding of what constitutes the facility's authorization basis must be defined; it is this basis that ultimately provides the acceptable bounds of operation without requiring prior DOE approval.	WHC-CM-1-3
Ch.III.3.b.	The intent of this Order is to preserve the authorization basis, and, if this basis is not reflected in total in the SAR, the contractor must define that population of documents comprising the various elements of the authorization basis and must use this defined population of documents as the basis for performing safety evaluations under the requirements of this Order.	WHC-CM-1-3
Ch.III.3.c.	It is expected that, as an initial step toward developing a USQ process, each contractor will define for their facility those aspects and documents that constitute the authorization basis and identify these documents within the facility USQ procedures.	WHC-CM-1-3
Ch.III.4.a.	DOE finds that it is acceptable to use screening criteria to limit the number of proposed actions for which written safety evaluations must be performed, provided the reasons for exclusion are documented and well supported.	WHC-CM-1-3
Ch.III.4.c.	A different manner in which screening criteria may be applied is through categorical exclusions (e.g., different procedure types).	WHC-CM-1-3

Criteria	DOE Order 5480.21, "Unreviewed Safety Questions"	Mandatory
Ch.III.4.d.	The application of screening criteria for administrative changes may prove useful, but contractors must ensure that the use of these criteria do not inappropriately screen out changes that require safety evaluations.	WHC-CM-1-3
Ch.III.5.a.[1]	Contractors are required to develop procedures that provide detailed guidance for the performance and review of USQ determinations.	WHC-CM-1-3
Ch.III.5.a.[2]	At a minimum, the procedures shall define the purpose of the procedure; set forth the procedures' applicability; provide definitions of appropriate terms, including those set forth in this Order; include screening criteria, as appropriate, and the basis for their application; include detailed guidance on what must be considered and evaluated when performing or reviewing a safety evaluation; define the qualifications needed and responsibilities of personnel performing and reviewing safety evaluations; and include documentation requirements for each USQ determination.	WHC-CM-1-3
Ch.III.5.c.[1]	Contractors are expected to provide detailed guidance and instructions on how to perform a safety evaluation.	WHC-CM-1-3
Ch.III.6.b.	When making a change, the safety analysis process requires that all aspects of both design and performance be considered.	WHC-CM-1-3
Ch.III.9.b.	Because the concepts set forth in this Order are not new to DOE and its contractors, but merely clarify and consolidate requirements previously implemented within the DOE Order system, compliance with this Order is expected immediately upon its promulgation. However, since DOE understands that the manner and rigor with which this Order is implemented departs somewhat from previous interpretations of these requirements, implementation of a program in the manner described herein shall be established based on the schedule set forth below. Development of Facility-Specific Safety Evaluation Procedures. These procedures shall be completed within 9 months of the promulgation of this Order.	WHC-CM-1-3

DOE Order 5480.22, Technical Safety Requirements

The following Reference(s) have been cited in the attached DOE Order 5480.22, "Technical Safety Requirements," Compliance Assessments.

WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-6-32, *Safety Analysis and Regulation Work Procedures*, Westinghouse Hanford Company, Richland, Washington.

Implementation Plan for DOE Orders 5480.21, .22, and .23, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5480.22, "Technical Safety Requirements"	Mandatory
9.a.(1)	A contractor responsible for the operation of a DOE nuclear facility shall: prepare Technical Safety Requirements for the facility.	WHC-CM-4-46
9.a.(2)	A contractor responsible for the operation of a DOE nuclear facility shall: submit the Technical Safety Requirements to the PSO for approval.	WHC-CM-6-32
9.a.(3)	A contractor responsible for the operation of a DOE nuclear facility shall: operate the facility in accordance with the Technical Safety Requirements as approved by the PSO including any modification by the PSO.	WHC-CM-4-46
9.b.(1)	Technical Safety Requirements shall define the operating limits and surveillance requirements, the basis thereof, safety boundaries, and management or administrative controls necessary to protect the health and safety of the public and to minimize the potential risk to workers from the uncontrolled release of radioactive or other hazardous materials and from radiation exposure due to inadvertent criticality.	WHC-CM-4-46
9.b.(2)	Technical Safety Requirements shall be based on the facility Safety Analysis Report and shall set forth specific limits and other requirements as specified in this Order and Attachment 1 to this Order.	WHC-CM-4-46
9.e.(1)[1]	Technical Safety Requirements shall consist of the following: Use and Application. Definitions of terms, operating modes, frequency notations, and actions to be taken in the event of violation of Technical Safety Requirements operating limits or surveillance requirements are to be included in the Use and Application section.	WHC-CM-4-46
9.e.(1)[2]	Technical Safety Requirements shall consist of the following: This section of the Technical Safety Requirements shall contain the basic instructions for using and applying the safety restriction contained in the Technical Safety Requirements.	WHC-CM-4-46
9.e.(2)[1]	Technical Safety Requirements shall consist of the following: Safety Limits (SL). If any Safety Limit is exceeded at any reactor or nonreactor nuclear facility, action shall begin immediately to place the facility in the most stable, safe condition attainable including total shutdown of either reactor or nonreactor nuclear facilities. The appropriate time frame for the completion of the action for each nuclear facility has to be developed and justified by the contractor, as appropriate, in the TSR document which requires PSO approval.	WHC-CM-4-46
9.e.(2)[2]	Technical Safety Requirements shall consist of the following: The SLs shall describe the action to be taken when an SL is exceeded. If a SL is exceeded, the contractor shall notify DOE in accordance with DOE 5000.3A, review the matter, and record the results of the review.	WHC-CM-4-46
9.e.(2)[3]	Technical Safety Requirements shall consist of the following: The review shall include the cause of the condition and the basis for any corrective actions taken to preclude reoccurrence.	WHC-CM-4-46
9.e.(2)[4]	Technical Safety Requirements shall consist of the following: The safe, stable condition entered as corrective action shall be maintained until the cognizant Program Manager authorizes further operations.	WHC-CM-4-46
9.e.(3)(a)[1]	Technical Safety Requirements shall consist of the following: Limiting Control Settings (LCS). This subsection of the Technical Safety Requirements shall contain the settings for automatic alarms and automatic or non-automatic initiation of protective actions related to those variables having significant safety functions.	WHC-CM-4-46

Criteria	DOE Order 5480.22, "Technical Safety Requirements"	Mandatory
9.e.(3)(a)[2]	Technical Safety Requirements shall consist of the following: The specific settings shall be chosen such that if exceeded, sufficient time is available to automatically or manually correct the condition prior to exceeding Safety Limits.	WHC-CM-4-46 WHC-CM-6-32
9.e.(3)(a)[3]	Technical Safety Requirements shall consist of the following: If the automatic alarms or protective devices do not function as required during applicable operating modes, the contractor shall take action as defined in the Limiting Control Setting to maintain the variables within the requirements and to promptly repair the automatic devices or the affected part of the process or, if required, the facility shall be placed in its most safe, stable condition.	WHC-CM-4-46
9.e.(3)(a)[4]	Technical Safety Requirements shall consist of the following: The LCS shall describe the action taken in case of exceedance of LCS.	WHC-CM-4-46
9.e.(3)(a)[5]	Technical Safety Requirements shall consists of the following: If an LCS is exceeded, the contractor shall notify DOE in accordance with DOE 5000.3A, review the matter, and record the results of the review including the cause of the condition and the basis for any corrective actions taken to preclude reoccurrence.	WHC-CM-4-46
9.e.(3)(b)[1]	Technical Safety Requirements shall consists of the following: Limiting Conditions for Operation (LCO). This subsection of the TSR shall contain the limits on functional capability or performance level.	WHC-CM-4-46
9.e.(3)(b)[2]	Technical Safety Requirements shall consists of the following: When a Limiting Condition for Operation is not met, the contractor shall take remedial actions defined by the Technical Safety Requirements until the condition can be met.	WHC-CM-4-46
9.e.(3)(b)[3]	Technical Safety Requirements shall consists of the following: The LCO shall describe the action to be taken in case of exceedance of the LCO.	WHC-CM-4-46
9.e.(3).(b).[4]	Technical Safety Requirements shall consists of the following: In cases of exceedance of an LCO, the contractor shall notify DOE in accordance with DOE 5000.3A, review the matter, and record the results of the review including the cause of the condition and the basis for any corrective actions taken to preclude reoccurrence.	WHC-CM-4-46
9.e.(4)[1]	Technical Safety Requirements shall consists of the following: Surveillance Requirements. This section of the Technical Safety Requirements shall contain the requirements necessary to maintain operation of the facility within the Safety Limits, Limiting Control Settings, and Limiting Conditions for Operations.	WHC-CM-4-46
9.e.(4)[2]	Technical Safety Requirements shall consists of the following: In the event that Surveillance Requirements are not successfully completed or accomplished within their required frequency, the systems or components involved shall be assumed to be inoperative and actions defined by the Limiting Condition for Operation or Limiting Control Setting shall be taken until the systems or components can be shown to be operable.	WHC-CM-6-32
9.e.(5)[1]	Technical Safety Requirements shall consists of the following: Administrative Controls. This section of the Technical Safety Requirements shall contain the requirements associated with Administrative Controls including those for reporting deviations from Technical Safety Requirements (i.e., exceedances of LCO, LCS, or SR, or violation of TSR).	WHC-CM-4-46

Criteria	DOE Order 5480.22, "Technical Safety Requirements"	Mandatory
9.e.(5)[2]	Technical Safety Requirements shall consists of the following: Staffing requirements for facility position important to safe operation of the facility shall be provided in the Administrative Controls sections.	WHC-CM-4-46
9.e.(5)[3]	Technical Safety Requirements shall consists of the following: Physical and administrative controls of the criticality safety program shall also be provided in the Administration Controls section.	WHC-CM-4-46
9.e.(6)(a)[1]	Technical Safety Requirements shall consists of the following: Appendices. The following information shall be in the Appendices: Basis. This Appendix shall provide summary statements of the reasons for the operating limits and associated surveillance requirements.	WHC-CM-4-46
9.e.(6)(a)[2]	Technical Safety Requirements shall consists of the following: The following information shall be in the Appendices: The basis shall show how the numeric value, the condition, or the surveillance does fulfill the purpose derived from the safety documentation.	WHC-CM-4-46
9.f.[1]	The TRS shall be kept current at all times so that it reflects the facility as it exists and as it is analyzed in Safety Analysis Reports.	WHC-CM-4-46
9.f.[2]	Contractors shall determine whether revisions to the Technical Safety Requirements are required upon originating or proposing a revision to a Safety Analysis Report, and, if so, shall prepare revisions and submit them with their basis for PSO approval concurrent with the revisions to the Safety Analysis Report.	WHC-CM-4-46
9.f.[3]	The TSR must be approved prior to facility or facility practice change.	WHC-CM-4-46
9.f.[4]	To assure that the TSR is current, it shall be reviewed at least annually along with the facility Safety Analysis Report.	WHC-CM-4-46
9.g.[1]	All proposed revisions to Technical Safety Requirements or its Appendices shall be submitted for PSO approval.	WHC-CM-4-46
9.g.[2]	Such submittals shall include the basis for the proposed revision.	WHC-CM-4-46
9.g.[3]	Revision implementation shall occur only after PSO approval.	WHC-CM-4-46
9.h.[1]	Only the current PSO-approved Technical Safety Requirements shall be used for the operation of the facility.	WHC-CM-4-46
9.h.[2]	The current PSO-approved Technical Safety Requirements shall be a controlled document.	WHC-CM-4-46
9.i.[2]	Such contractor actions shall be approved, as a minimum, by a certified operator or supervisor certified on that system through an accredited training program.	
9.i.[3]	If emergency actions are taken, verbal notifications shall be made to the Head of the Field Element within 2 hours and by written reports to the PSO within 24 hours.	
10.a.[1]	For new facilities, the contractor shall submit a draft Technical Safety Requirements document with its appendices to the PSO for approval.	WHC-CM-6-32

Criteria	DOE Order 5480.22, "Technical Safety Requirements"	Mandatory
10.a.[2]	PSO approval of the Technical Safety Requirements document shall be obtained prior to operation.	WHC-CM-4-46
10.b.[1]	For existing facilities that do not have DOE approved Technical Specifications or Operational Safety Requirements, the contractor shall submit for approval a schedule for the development and delivery of a draft Technical Safety Requirements document and its appendices that satisfy the requirements of this Order. This schedule shall be submitted to the PSO for approval by August 25, 1992.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.b.[2]	This submittal shall include the basis for the content, schedule, and level of detail proposed, basis for interim operation or restrictions on interim operations, and administrative controls during the upgrade process.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.b.[3]	Once a submitted plan and schedule is approved by the PSO, the contractor shall comply with the plan and schedule including any modifications made by the PSO.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.b.[4]	Unless approved by the PSO earlier, the plan and schedule submitted by a contractor, as modified or directed to be modified by the PSO, shall be considered to be approved 180 days after submittal.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.b.[5]	Approved plans and schedules may be changed, but such changes must be approved in the same manner as initial plans and schedules.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.b.[6]	The draft TSR shall be submitted to the PSO no later than February 25, 1995.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.c	For existing facilities that have DOE-approved Technical Specifications or Operational Safety Requirements, a review shall be conducted by the contractor to compare these documents with the provisions of this Order and its related guidance, Attachment 1.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.c.(1)[1]	If the existing Technical Specifications or Operational Safety Requirements comply with the provisions of this Order and guidance, except for format, the contractor shall submit a statement to the PSO stipulating to that fact by August 25, 1992. A copy of the existing documents shall accompany the statement.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.c.(1)[3]	A schedule shall be submitted to the PSO for the conversion of the existing Technical Specifications or Operational Safety Requirements to Technical Safety Requirements (i.e., reprinting, changing references in procedures, etc.).	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.c.(1)[4]	Unless approved by the PSO earlier, the statement and schedule submitted by the contractor, as modified or directed to be modified by the PSO, shall be considered to be approved 180 days after submittal.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.c.(1)[5]	Approved statements and schedules may be changed but such changes must be approved in the same manner as initial statements and schedules.	Implementation Plan for DOE Orders 5480.21, .22, and .23

Criteria	DOE Order 5480.22, "Technical Safety Requirements"	Mandatory
10.c.(1)[6]	The existing Technical Specifications or Operational Safety Requirements shall be converted to Technical Safety Requirements (i.e., reprinting, changing references in procedures, etc.) when revisions are made to the documents or, in any event, by February 25, 1995.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.c.(1)[7]	During the interim period until the revised Technical Safety Requirements are approved by the PSO, the existing Technical Specification or Operational Safety Requirements or subset thereof shall be treated as DOE-approved Technical Safety Requirements for purposes of this Order.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.c.(2)[1]	If the existing Technical Specification or Operational Safety Requirements do not comply with the provisions of this Order and guidance (Attachment 1), the contractor shall provide a plan and schedule for making the revisions necessary to bring the document into compliance. The schedule shall be submitted to the PSO for approval by August 25, 1992.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.c.(2)[2]	This submittal shall describe the need for upgrading the TS or OSR and shall include the basis for the content, schedule, and level of detail proposed, basis for interim operation or restrictions on interim operations, and administrative controls during the upgrade process.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.c.(2)[3]	Once a submitted plan and schedule is approved by the PSO, the contractor shall comply with the plan and schedule including any modifications by the PSO.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.c.(2)[4]	Unless approved by the PSO earlier, the plan and schedule submitted by a contractor, as modified or directed to be modified by the PSO, shall be considered to be approved 180 days after submittal.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.c.(2)[5]	Approved plans and schedules may be changed, but such changes must be approved in the same manner as the initial plans and schedules.	Implementation Plan for DOE Orders 5480.21, .22, and .23
10.c.(2)[6]	The draft Technical Safety Requirements shall be submitted to the PSO for approval no later than February 25, 1995.	Implementation Plan for DOE Orders 5480.21, .22, and .23
9.e.(3)(b)[4]	Technical Safety Requirements shall consists of the following: In cases of exceedance of an LCO, the contractor shall notify DOE in accordance with DOE 5000.3A, review the matter, and record the results of the review including the cause of the condition and the basis for any corrective actions taken to preclude reoccurrence.	WHC-CM-4-46 WHC-CM-1-3
9.e.(6)(b)	Technical Safety Requirements shall consists of the following: The following information shall be in the Appendices: Design Features. This Appendix shall describe passive design features of the facility which, if altered or modified, would have a significant effect on safe operation.	WHC-CM-4-46

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DOE Order 5480.23, Nuclear Safety Analysis Reports

The following Reference(s) have been cited in the attached DOE Order 5480.23, "Nuclear Safety Analysis Reports", Compliance Assessment.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*, Westinghouse Hanford Company, Richland, Washington.

Implementation Plan for DOE Orders 5480.21, .22, and .23, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE ORDER 5480.23, "Nuclear Safety Analysis Reports"	Mandatory
7.b.(1)	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Require that contractors prepare and update Safety Analysis Reports for each nuclear facility and nuclear operations under their jurisdiction (unless exempted) that establishes and evaluates the adequacy of the safety basis of the facility in accordance with the provisions of this Order.	WHC-CM-4-46
7.b.(2)[1]	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Review and approve Safety Analysis Reports and revisions thereto for all nuclear facilities and operations.	WHC-CM-4-46
7.b.(2)[2]	Program Secretarial Officers (PSOs) or their designees in the line organization shall: The PSO shall issue a Safety Evaluation Report that documents the bases upon which the approvals have been made.	WHC-CM-4-46
7.b.(3)	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Assure that all commitments made in the approved Safety Analysis Report are carried out by the contractors for the nuclear facilities and nuclear operations.	WHC-CM-4-46
7.b.(4)(a)[1]	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Perform the following functions: Issue permanent exemptions to the requirements of this Order for nonreactor nuclear facilities under his/her cognizance where hazards are of a low magnitude (i.e. hazard Category 3 facilities).	WHC-CM-4-46
7.b.(4)(a)[2]	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Perform the following functions: These permanent exemptions must be formally issued and must include an adequate basis justifying the action to ensure, that with proper controls, worker and public health and safety are not affected by the consequences of any postulated DBAs.	WHC-CM-4-46
7.b.(4)(a)[3]	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Perform the following functions: These permanent exemptions may be granted by the responsible PSO only after obtaining the concurrence of the Office of Nuclear Safety (NS-1), Office of Environment, Safety and Health (EH-1), and Office of Nuclear Energy (NE-1).	WHC-CM-4-46
7.b.(4)(b)	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Perform the following functions: Formally request, after obtaining the concurrence of NS-1, EH-1, and NE-1, the Secretary of Energy to grant permanent exemptions to the requirements of this Order for hazard Category 1 and hazard Category 2 facilities under his/her cognizance.	WHC-CM-4-46
7.b.(4)(c)[1]	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Perform the following functions: Grant temporary exemptions to the requirements of this Order for any activity under his/her cognizance, up to one year in duration.	WHC-CM-4-46
7.b.(4)(c)[2]	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Perform the following functions: Prior to approval, NS-1 and EH-1 shall also be notified in a timely manner in order to discharge their assigned responsibility.	WHC-CM-4-46
7.b.(5)	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Provide guidance and assistance to field organizations in applying the graded approach for the facility, and the performance of safety reviews, appraisals, etc., to assure contractor compliance with the provisions of this Order.	WHC-CM-4-46

Criteria	DOE ORDER 5480.23, "Nuclear Safety Analysis Reports"	Mandatory
7.b.(6)	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Conduct appraisals to assure contractor compliance with this Order.	WHC-CM-4-46
7.b.(7)	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Transmit the results of the actions taken above to the responsible program managers and field organizations with any necessary or appropriate instructions as to subsequent action to be taken, with a copy to the Office of Nuclear Safety and the Office of Environment, Safety and Health depending on the nature of the issue being addressed.	WHC-CM-4-46
7.b.(8)	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Keep the Office of Nuclear Safety and the Office of Environment, Safety and Health, advised of nuclear safety or nonnuclear, occupational safety and health problems, deficiencies, needs, and actions taken under this Order.	WHC-CM-4-46
7.b.(9)	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Designate an individual(s) to be responsible for bringing to the attention of the contracting officer each procurement falling within the scope of this Order. Unless another individual is designated, the responsibility is that of the procurement request originator (the individual responsible for initiating a requirement of DOE F 4200.33).	WHC-CM-4-46
7.b.(9)(a)(1)	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Procurement request originators (the individuals responsible for initiating a requirement on DOE F 4200.33) or such other individuals as designated by the cognizant PSO shall bring to the attention of the cognizant contracting officer the following: each procurement requiring the application of this Order,	WHC-CM-4-46
7.b.(9)(a)(2)	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Procurement request originators (the individuals responsible for initiating a requirement on DOE F 4200.33) or such other individuals as designated by the cognizant PSO shall bring to the attention of the cognizant contracting officer the following: requirements for flowdown of provisions of this Order to any subcontract or subaward,	WHC-CM-4-46
7.b.(9)(a)(3)	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Procurement request originators (the individuals responsible for initiating a requirement on DOE F 4200.33) or such other individuals as designated by the cognizant PSO shall bring to the attention of the cognizant contracting officer the following: identification of the paragraphs or other portions of this Directive with which the awardee, or, if different, a sub-awardee, is to comply.	WHC-CM-4-46
7.b.(9)(b)[1]	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Contracting officers, based on advice received from the procurement request originator or other designated individual, shall apply applicable provisions of this Order to awards falling within its scope.	WHC-CM-4-46
7.b.(9)(b)[2]	Program Secretarial Officers (PSOs) or their designees in the line organization shall: For awards, other than management and operating contracts, this shall be by incorporation or reference using explicit language in a contractual action, usually bilateral. All paragraphs of this Order shall be applied to contractors excluding Paragraph 7.	WHC-CM-4-46

Criteria	DOE ORDER 5480.23, "Nuclear Safety Analysis Reports"	Mandatory
7.b.(10)	Program Secretarial Officers (PSOs) or their designees in the line organization shall: Designate in writing the design, construction, or operations contractors that will be responsible for preparing a safety analysis report for each nuclear facility or nuclear operation.	WHC-CM-4-46
7.c.(1)	DOE Field Office Managers or Field Program Managers shall: Review and make recommendations to the PSO relative to the adequacy of all new SARs, as well as all revisions to existing SARs.	WHC-CM-4-46
7.c.(2)	DOE Field Office Managers or Field Program Managers shall: Oversee contractor preparation and review of safety analyses, including nuclear criticality, hazards classification, safety evaluations and changes thereto consistent with this Order and other DOE Orders.	WHC-CM-4-46
7.c.(4)	DOE Field Office Managers or Field Program Managers shall: Designate an individual(s) to be responsible for bringing to the attention of the contracting officer each procurement falling within the scope of this Order. Unless another individual is designated, the responsibility is that of the procurement request originator (the individual responsible for initiating a requirement on DOE F 4200.33).	WHC-CM-4-46
7.c.(4)(a)(1)	DOE Field Office Managers or Field Program Managers shall: Procurement request originators (the individuals responsible for initiating a requirement on DOE F 4200.33) or such other individuals(s) as designated by the cognizant PSO shall bring to the attention of the cognizant contracting officer the following: each procurement requiring the application of this Order,	WHC-CM-4-46
7.c.(4)(a)(2)	DOE Field Office Managers or Field Program Managers shall: Procurement request originators (the individuals responsible for initiating a requirement on DOE F 4200.33) or such other individual(s) as designated by the cognizant PSO shall bring to the attention of the cognizant contracting officer the following: requirements for flowdown of provisions of this Order to any sub-contract or sub-award,	WHC-CM-4-46
7.c.(4)(a)(3)	DOE Field Office Managers or Field Program Managers shall: Procurement request originators (the individuals responsible for initiating a requirement on DOE F 4200.33) or such other individual(s) as designated by the cognizant PSO shall bring to the attention of the cognizant contracting officer the following: identification of the paragraphs or other portions of this Directive with which the awardee, or, if different, a sub-awardee, is to comply.	WHC-CM-4-46
7.c.(4)(b)[1]	DOE Field Office Managers or Field Program Managers shall: Contracting officers, based on advice received from the procurement request originator or other designated individual, shall apply applicable provisions of this Order to awards falling within its scope.	WHC-CM-4-46
7.c.(4)(b)[2]	DOE Field Office Managers or Field Program Managers shall: For awards, other than management and operating contracts, this shall be by incorporation or reference using explicit language in a contractual action, usually bilateral. All paragraphs of this Order shall be applied to contractors excluding Paragraph 7.	WHC-CM-4-46
7.d.(1)	Director of the Office of Nuclear Safety (NS-1), acting as the independent element responsible for nuclear safety oversight of line management for the Department, shall: Monitor and audit the implementation of all aspects of this Order related to nuclear safety, including field organization and contractor performance;	WHC-CM-4-46

Criteria	DOE ORDER 5480.23, "Nuclear Safety Analysis Reports"	Mandatory
7.d.(2)	Director of the Office of Nuclear Safety (NS-1), acting as the independent element responsible for nuclear safety oversight of line management for the Department, shall: Review documentation such as Technical Safety Appraisals, implementation schedules, TSRs, SARs and program office and site reports, and observe on-site activities;	WHC-CM-4-46
7.d.(3)	Director of the Office of Nuclear Safety (NS-1), acting as the independent element responsible for nuclear safety oversight of line management for the Department, shall: Identify circumstances that are indicative of deteriorating or poor performance that may warrant further action;	WHC-CM-4-46
7.d.(4)	Director of the Office of Nuclear Safety (NS-1), acting as the independent element responsible for nuclear safety oversight of line management for the Department, shall: Concur with requests for permanent exemptions from the requirements of this Order.	WHC-CM-4-46
7.g	Assistant Secretary for Environment, Safety and Health (EH-1), acting as the independent element responsible for nonnuclear and occupational safety and health oversight of the line organizations for the Department, shall monitor and audit all aspects of the implementation of this Order related to nonnuclear and occupational safety and health, including line and field organization and contractor performance for these areas.	WHC-CM-4-46
8.[1]	A contractor, as designated in writing by the PSO, who is responsible for the design, construction, or operation of DOE nuclear facilities shall be required to perform a safety analysis that develops and evaluates the adequacy of the safety basis for each such facility.	WHC-CM-4-46
8.[2]	The safety basis to be analyzed shall include management, design, construction, operation, and engineering characteristics necessary to protect the public, workers, and the environment from the safety and health hazards posed by the nuclear facility or nonfacility nuclear operations.	WHC-CM-4-46
8.[3]	All contractors shall be held responsible for adhering to assumptions and commitments set forth in the safety analysis.	WHC-CM-4-46
8.[4]	Contractors shall be required to prepare, and shall submit to DOE for its approval, SARs documenting safety analyses for each DOE nuclear facility under their cognizance.	WHC-CM-4-46
8.[5]	Contractors responsible for conducting one or more nonfacility nuclear operations are required to maintain up to date analyses of the safety of such operations and analyses documented in a form that is auditable by DOE.	WHC-CM-4-46
8.a.(1)[1]	Justification for the level of analyses and documentation for each hazard considered shall be provided as part of the plan and schedule submitted in accordance with paragraph 9(b)(2) of this Order.	WHC-CM-4-46
8.a.(1)[2](a)	The level of analysis and documentation for each facility must be commensurate with: The magnitude of the hazards being addressed;	WHC-CM-4-46
8.a.(1)[2](b)	The level of analysis and documentation for each facility must be commensurate with: The complexity of the facility and/or systems being relied on to maintain an acceptable level of risk;	WHC-CM-4-46
8.a.(1)[2](c)	The level of analysis and documentation for each facility must be commensurate with: The stage or stages of the facility life cycle for which DOE approval is sought.	WHC-CM-4-46

Criteria	DOE ORDER 5480.23, "Nuclear Safety Analysis Reports"	Mandatory
8.a.(2)	This application of the graded approach is specific for the SAR.	WHC-CM-4-46
8.b.(1)	SARs shall define the safety basis, document the logic of its derivation, demonstrate adherence to the safety basis, and justify its adequacy.	WHC-CM-4-46
8.b.(2)	Each SAR required by this Order shall include thorough documentation of the assumptions employed in the safety analysis.	WHC-CM-4-46
8.b.(3)[1]	A SAR shall include the results of the safety analysis that identifies the dominant contributors to the risk of the facility so that these vulnerabilities can be better managed.	WHC-CM-4-46
8.b.(3)[2](a)	The safety analysis report shall address the following topics: Executive summary;	WHC-CM-4-46
8.b.(3)[2](c)	The safety analysis report shall address the following topics: Site characteristics;	WHC-CM-4-46
8.b.(3)[2](g)	The safety analysis report shall address the following topics: Radioactive and hazardous material waste management;	WHC-CM-4-46
8.b.(3)[2](b)	The safety analysis report shall address the following topics: Applicable statutes, rules, regulations and Departmental Orders;	WHC-CM-4-46
8.b.(3)[2](d)	The safety analysis report shall address the following topics: Facility description and operation, including design of principal structures, components, all systems, engineered safety features, and processes;	WHC-CM-4-46
8.b.(3)[2](e)	The safety analysis report shall address the following topics: Hazard analysis and classification of the facility;	WHC-CM-4-46
8.b.(3)[2](f)	The safety analysis report shall address the following topics: Principal health and safety criteria;	WHC-CM-4-46
8.b.(3)[2](h)	The safety analysis report shall address the following topics: Inadvertent criticality protection;	WHC-CM-4-46
8.b.(3)[2](i)	The safety analysis report shall address the following topics: Radiation protection;	WHC-CM-4-46
8.b.(3)[2](j)	The safety analysis report shall address the following topics: Hazardous material protection;	WHC-CM-4-46
8.b.(3)[2](k)	The safety analysis report shall address the following topics: Analysis of normal, abnormal, and accident conditions, including design basis accidents; assessment of risks; consideration of natural and manmade external events; assessment of contributory and casual events, mechanisms, and phenomena; and evaluation of the need for an analysis of beyond-design-basis accidents; however, the SAR is to exclude acts of sabotage and other malevolent acts since these actions are covered under security protection of the facility.	WHC-CM-4-46
8.b.(3)[2](l)	The safety analysis report shall address the following topics: Management, organization, and institutional safety provisions;	WHC-CM-4-46
8.b.(3)[2](m)	The safety analysis report shall address the following topics: Procedures and training;	WHC-CM-4-46
8.b.(3)[2](n)	The safety analysis report shall address the following topics: Human factors;	WHC-CM-4-46

Criteria	DOE ORDER 5480.23, "Nuclear Safety Analysis Reports"	Mandatory
8.b.(3)[2](o)	The safety analysis report shall address the following topics: Initial testing, inservice surveillance, and maintenance;	WHC-CM-4-46
8.b.(3)[2](p)	The safety analysis report shall address the following topics: Derivation of TSRs;	WHC-CM-4-46
8.b.(3)[2](q)	The safety analysis report shall address the following topics: Operational safety;	WHC-CM-4-46
8.b.(3)[2](r)	The safety analysis report shall address the following topics: Quality assurance;	WHC-CM-4-46
8.b.(3)[2](s)	The safety analysis report shall address the following topics: Emergency preparedness;	WHC-CM-4-46
8.b.(3)[2](t)	The safety analysis report shall address the following topics: Provisions for decontamination and decommissioning;	WHC-CM-4-46
8.b.(3)[2](u)	The safety analysis report shall address the following topics: Applicable Facility design codes and standards.	WHC-CM-4-46
8.c.(1)(a)	Contracts shall be required to perform a hazard analysis of their nuclear activities and classify their processes, operations, or activities in accordance with the following requirements: Classification Categories. The consequences of unmitigated releases of radioactive and/or hazardous material shall be evaluated and classified by the following hazard categories: Category 1 Hazard. ...	WHC-CM-4-46
8.c.(1)(b)	Contracts shall be required to perform a hazard analysis of their nuclear activities and classify their processes, operations, or activities in accordance with the following requirements: Classification Categories. The consequences of unmitigated releases of radioactive and/or hazardous material shall be evaluated and classified by the following hazard categories: Category 2 Hazard. ...	WHC-CM-4-46
8.c.(1)(c)	Contracts shall be required to perform a hazard analysis of their nuclear activities and classify their processes, operations, or activities in accordance with the following requirements: Classification Categories. The consequences of unmitigated releases of radioactive and/or hazardous material shall be evaluated and classified by the following hazard categories: Category 3 Hazard. ...	WHC-CM-4-46
8.c.(2)	Contracts shall be required to perform a hazard analysis of their nuclear activities and classify their processes, operations, or activities in accordance with the following requirements: The hazard analysis shall be based on an inventory enveloping all radioactive and nonradioactive hazardous materials that are stored, utilized, or may be formed within a nuclear facility.	WHC-CM-4-46
8.c.(3)[1]	Contracts shall be required to perform a hazard analysis of their nuclear activities and classify their processes, operations, or activities in accordance with the following requirements: The hazard analysis shall identify energy sources or processes that might contribute to the generation or uncontrolled release of hazardous materials.	WHC-CM-4-46

Criteria	DOE ORDER 5480.23, "Nuclear Safety Analysis Reports"	Mandatory
8.c.(3)[2]	Contracts shall be required to perform a hazard analysis of their nuclear activities and classify their processes, operations, or activities in accordance with the following requirements: The hazard analysis shall estimate the consequences of accidents in which the facility or process and/or materials in the inventory are assumed to interact, react, or be released in a manner to produce a threat or challenge to the health and safety of individuals on site and off site.	WHC-CM-4-46
8.c.(4)	Contracts shall be required to perform a hazard analysis of their nuclear activities and classify their processes, operations, or activities in accordance with the following requirements: The hazard analysis shall be submitted to DOE for approval in accordance with the safety analysis plan and schedule required by paragraph 9(b)(2) of this Order.	Implementation Plan for DOE Orders 5480.21, .22, and .23
8.d	Contractors with the primary responsibility for the design, construction, operation, or decommissioning of DOE nuclear facilities must maintain such document control as may be necessary to ensure that all users of SARs and their supporting documentation designated by DOE or the contractor as authorized users, including DOE line management and the Department's safety oversight groups, have current editions.	WHC-CM-4-46
9.a.(1)[1]	Contractors shall be required to obtain PSO approval of Preliminary Safety Analysis Reports (PSARs) prior to undertaking procurement of materials and components, construction, and preoperational testing of DOE nuclear facilities.	WHC-CM-4-46
9.a.(1)[3]	PSARs shall document the adequacy of the safety basis for a new nuclear facility and provide assurance that the facility can be constructed, operated, maintained, and shut down safely and in compliance with applicable laws and regulations.	WHC-CM-4-46
9.a.(2)[1]	Contractors shall be required to submit Final Safety Analysis Reports (FSARs) to the PSO for approval and authorization to operate DOE nuclear facilities.	WHC-CM-4-46
9.a.(2)[2]	FSARs shall document the adequacy of the safety basis and provide assurance that the facility can be operated, maintained, and shut down safely and in compliance with applicable laws and regulations.	WHC-CM-4-46
9.b.(1)[1]	Contractors responsible for the operation of DOE-owned nuclear facilities that are scheduled to submit a Safety Analysis Report within 12 months after the date of issuance of this Order, shall implement a program to upgrade, as necessary, the safety analyses to reflect the requirements of this Order.	Implementation Plan for DOE Orders 5480.21, .22, and .23
9.b.(1)[2]	The upgraded safety analysis shall provide assurance that the facility can be operated, maintained, and shut down safely and be in compliance with applicable laws and regulations.	Implementation Plan for DOE Orders 5480.21, .22, and .23
9.b.(1)[3]	Upgraded SAR's shall be submitted to the PSO for approval in accordance with the plan and schedule required by paragraph 9(b)(2) of this Order.	Implementation Plan for DOE Orders 5480.21, .22, and .23
9.b.(2)[1]	Each contractor responsible for submitting a SAR shall be required to submit to the PSO, for its review and approval, an overall plan and schedule for completing this effort.	Implementation Plan for DOE Orders 5480.21, .22, and .23

Criteria	DOE ORDER 5480.23, "Nuclear Safety Analysis Reports"	Mandatory
9.b.(2)[2]	For existing facilities or operations, the plan and schedule shall be submitted to the Department for approval by 6 months after the date of issuance of this Order. This submittal shall describe the need for upgrading the SAR and shall include a preliminary assessment of facility hazards, the basis for the content, schedule, and level of detail proposed, bases for interim operation or restrictions on interim operations, and administrative controls during the upgrade process.	Implementation Plan for DOE Orders 5480.21, .22, and .23
9.b.(2)[3]	Once a submitted plan and schedule is approved by DOE, the contractor shall comply with the plan and schedule, including any DOE modifications.	Implementation Plan for DOE Orders 5480.21, .22, and .23
9.b.(2)[4]	The plan and schedule submitted by a contractor shall be considered approved 180 days after submittal, including any modifications made or directed by DOE during or after this period, unless it is approved by DOE at an earlier date.	Implementation Plan for DOE Orders 5480.21, .22, and .23
9.b.(2)[5]	Approved plans and schedules may be changed, but such changes must be approved in the same manner as initial plans and schedules.	Implementation Plan for DOE Orders 5480.21, .22, and .23
9.c.[1]	Contractors shall be required to review and update as necessary, SARs annually, pursuant to this Order to ensure that the information in each SAR is current and remains applicable. Revisions shall be submitted to the PSO at least annually and shall reflect all changes implemented up to 6 months prior to the filing of the updated SAR.	WHC-CM-4-46
9.c.[2]	The DOE approval of any Unreviewed Safety Question pursuant to DOE 5480.21, amendments to the TSRs, and the material submitted by the contractor to the PSO in support of these approvals shall be considered an addendum to the SAR until the information is incorporated into the SAR as part of the next annual update.	WHC-CM-1-3

DOE Order 5480.24, Nuclear Criticality Safety

The following Reference(s) have been cited in the attached DOE Order 5480.24, "Nuclear Criticality Safety", Compliance Assessments.

WHC-CM-4-29, *Nuclear Criticality Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*, Westinghouse Hanford Company, Richland, Washington.

Implementation Plan for DOE Orders 5480.21, .22, and .23, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5480.24, "Nuclear Criticality Safety"	Mandatory
7.a. [1]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The basic elements and control parameters of programs for nuclear criticality safety shall satisfy the requirements of the following mandatory American Nuclear Society's ANSI/ANS nuclear criticality safety standards: ANS-8.1, "Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors," except paragraphs 4.2.2 and 4.2.3.	WHC-CM-4-29
7.a. [2]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The basic elements and control parameters of programs for nuclear criticality safety shall satisfy the requirements of the following mandatory American Nuclear Society's ANSI/ANS nuclear criticality safety standards: ANS-8.3, "Criticality Accident Alarm System," except paragraphs 4.2 and 4.2.2.	WHC-CM-4-29
7.a. [3]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The basic elements and control parameters of programs for nuclear criticality safety shall satisfy the requirements of the following mandatory American Nuclear Society's ANSI/ANS nuclear criticality safety standards: ANS-8.5, "Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Material."	TBD (ONLY ONE TANK ON SITE)
7.a. [4]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The basic elements and control parameters of programs for nuclear criticality safety shall satisfy the requirements of the following mandatory American Nuclear Society's ANSI/ANS nuclear criticality safety standards: ANS-8.15, "Nuclear Criticality Control of Special Actinide Elements."	
7.a. [5]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The basic elements and control parameters of programs for nuclear criticality safety shall satisfy the requirements of the following mandatory American Nuclear Society's ANSI/ANS nuclear criticality safety standards: ANS-8.19, "Administrative Practices for Nuclear Criticality Safety."	WHC-CM-4-29
7.a. [6]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The basic elements and control parameters of programs for nuclear criticality safety shall satisfy the requirements of the following mandatory American Nuclear Society's ANSI/ANS nuclear criticality safety standards: ANS-8.7, "Guide for Nuclear Criticality Safety in the Storage of Fissile Materials."	WHC-CM-4-29
7.a.(2)(a)	The contractor criticality safety program for nuclear facilities shall include the following requirements: The basic elements and control parameters of programs for nuclear criticality safety shall satisfy the requirements of the following mandatory American Nuclear Society's ANSI/ANS nuclear criticality safety standards: For DOE application, the following sections of ANS-8.1, "Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors," shall be read as follows: 4.2.2 Double Contingency Principle. Process designs shall incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible. Protection shall be provided by either (a) the control of two independent process parameters (which is the preferred approach, if practical) or (b) a system of multiple (at least two) controls on a single parameter. In all cases, no single failure shall result in the potential for a criticality accident. The basis for selecting either approach shall be fully documented.	WHC-CM-4-29

Criteria	DOE Order 5480.24, "Nuclear Criticality Safety"	Mandatory
7.a.(2)(b)[1]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The basic elements and control parameters of programs for nuclear criticality safety shall satisfy the requirements of the following mandatory American Nuclear Society's ANSI/ANS nuclear criticality safety standards: For DOE application, the following sections of ANSI-8.1, "Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors," shall be read as follows: 4.2.3 Geometry Control. As a first priority, reliance shall be placed on equipment design in which dimensions of the contained fissionable material and spacing between equipment are limited via passive engineering controls. Where geometry control is not feasible, the preferred order of controls is other passive engineering controls, active engineering controls, and administrative controls. Feasibility is determined by weighing risk versus practicality/cost. Full advantage may be taken of any nuclear characteristics of the process materials and equipment.	WHC-CM-4-29
7.a.(2)(b)[2]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The basic elements and control parameters of programs for nuclear criticality safety shall satisfy the requirements of the following mandatory American Nuclear Society's ANSI/ANS nuclear criticality safety standards: For DOE application, the following sections of ANSI-8.1, "Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors," shall be read as follows: All dimensions, nuclear properties, and other features upon which reliance is placed shall be verified prior to beginning operations, and control shall be exercised to maintain them.	WHC-CM-4-29
7.a.(2)(b)[3]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The basic elements and control parameters of programs for nuclear criticality safety shall satisfy the requirements of the following mandatory American Nuclear Society's ANSI/ANS nuclear criticality safety standards: For DOE application, the following sections of ANSI-8.1, "Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors," shall be read as follows: The basis for not selecting geometry control shall be fully documented.	WHC-CM-4-29
7.b.(1)	The contractor criticality safety program for nuclear facilities shall include the following requirements: The requirements in ANSI/ANS-8.3 relating to the needs for an alarm system are not applicable to this Order. For the purpose of this Order, Criticality Alarm Systems (CAS) and criticality detection systems shall be required as follows: In those cases where the mass of fissionable material exceeds the limits established in paragraph 4.2.1 of ANSI/ANS-8.3 and the probability of criticality is greater than 10^{-6} per year (as documented in a DOE approved SAR), a CAS meeting ANSI/ANS-8.3 shall be provided to cover occupied areas in which the expected dose exceeds 12 Rads in free air, where a CAS is defined to include a criticality accident detection device and a personnel evacuation alarm.	WHC-CM-4-29
7.b.(2)[3]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The requirements in ANSI/ANS-8.3 relating to the needs for an alarm system are not applicable to this Order. For the purpose of this Order, Criticality Alarm Systems (CAS) and criticality detection systems shall be required as follows: While an immediate evacuation alarm is not required under these circumstances, evacuation shall be implemented (i.e. evacuation notification or delayed alarm) if potential doses to occupational workers could be effectively limited by such actions in accordance with DOE 5480.11.	WHC-CM-4-29

Criteria	DOE Order 5480.24, "Nuclear Criticality Safety"	Mandatory
7.b.(2)[1]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The requirements in ANSI/ANS-8.3 relating to the needs for an alarm system are not applicable to this Order. For the purpose of this Order, Criticality Alarm Systems (CAS) and criticality detection systems shall be required as follows: In those cases where the mass of fissionable material exceeds the limits established in paragraph 4.2.1 of ANSI/ANS-8.3 and the probability of criticality is greater than 10^{-6} per year, (as documented in a DOE approved SAR), but there are no occupied areas in which the expected dose exceeds 12 Rads in free air, a criticality detection system shall be provided where a criticality detection system is defined to be an appropriate criticality accident detection device but without an immediate evacuation alarm.	WHC-CM-4-29
7.b.(3)[1]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The requirements in ANSI/ANS-8.3 relating to the needs for an alarm system are not applicable to this Order. For the purpose of this Order, Criticality Alarm Systems (CAS) and criticality detection systems shall be required as follows: In those cases where the mass of fissionable material exceeds the limits established in paragraph 4.2.1 of ANSI/ANS-8.3, but a criticality accident is determined to be impossible due to the physical form of the fissionable material, or the probability of occurrence is determined to be less than 10^{-6} per year (as documented in a DOE approved SAR), neither a CAS nor a criticality detection system is required.	WHC-CM-4-29
7.b.(4)	The contractor criticality safety program for nuclear facilities shall include the following requirements: The requirements in ANSI/ANS-8.3 relating to the needs for an alarm system are not applicable to this order. For the purpose of this order, criticality alarm systems (CAS) and criticality detection systems shall be required as follows: The decision to install a criticality detection system rather than a CAS, and the decision that neither a CAS nor a criticality detection system is necessary, must be justified based upon a documented DOE approved Safety Analysis.	WHC-CM-4-29
7.c. [1]	The contractor criticality safety program for nuclear facilities shall include the following requirements: Nuclear criticality safety programs shall be fully documented.	WHC-CM-4-29
7.c. [2]	The contractor criticality safety program for nuclear facilities shall include the following requirements: In addition to the requirements of the ANS standards, contractors shall perform detailed nuclear criticality safety analyses for specific operations, storage arrangements, and the handling and transportation of fissionable materials.	WHC-CM-4-29
7.c. [3]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The basis for criticality safety shall be included in the facility SAR.	WHC-CM-4-46
7.c. [4]	The contractor criticality safety program for nuclear facilities shall include the following requirements: Additionally, the limiting conditions of operation for criticality safety shall be included in the facility TSRs.	WHC-CM-4-29 WHC-CM-4-46
7.c.(1)	The contractor criticality safety program for nuclear facilities shall include the following requirements: The Criticality Safety section of the SAR shall include (or be included by referring to other sections of the SAR) but not be limited to the following: A description, using appropriate sketches or drawings, of equipment and facilities in which the hazard of criticality exists showing dimensions in sufficient detail to permit evaluation of the information mentioned in subparagraphs 7c(3) through 7c(6) below.	WHC-CM-4-29 WHC-CM-4-46
7.c.(2)	The contractor criticality safety program for nuclear facilities shall include the following requirements: The Criticality Safety section of the SAR shall include (or be included by referring to other sections of the SAR) but not be limited to the following: A statement of the chemical and physical form of fissionable material in each step of the process, including isotopic content, the nature of any material, and the resulting concentrations, densities, and degrees of moderation throughout the steps of the process.	WHC-CM-4-46

Criteria	DOE Order 5480.24, "Nuclear Criticality Safety"	Mandatory
7.c.(3)	The contractor criticality safety program for nuclear facilities shall include the following requirements: The Criticality Safety section of the SAR shall include (or be included by referring to other sections of the SAR) but not be limited to the following: A statement of the maximum quantities of fissionable material at any one time in each step of the process, including a description of the technical practices which are intended to prevent exceeding these maximum quantities.	WHC-CM-4-46
7.c.(4)	The contractor criticality safety program for nuclear facilities shall include the following requirements: The Criticality Safety section of the SAR shall include (or be included by referring to other sections of the SAR) but not be limited to the following: A description of the methods of collection, handling, and transportation products from each process area or individual operation and evaluation of the nuclear safety of these methods.	WHC-CM-4-46
7.c.(5)	The contractor criticality safety program for nuclear facilities shall include the following requirements: The Criticality Safety section of the SAR shall include (or be included by referring to other sections of the SAR) but not be limited to the following: An analysis of criticality incident scenarios and their impact on health and safety of the workers and/or public. This analysis will be used to determine the conditions of operation for criticality safety, the design of the CAS as noted in subparagraph (7) below, and the need for audible and/or visual alarms.	WHC-CM-4-46
7.c.(6)	The contractor criticality safety program for nuclear facilities shall include the following requirements: The Criticality Safety section of the SAR shall include (or be included by referring to other sections of the SAR) but not be limited to the following: A description of the safety control parameters which are intended to prevent criticality resulting from events such as: accumulation of fissionable material in scrap or waste, lathe turnings, crucible slag, pickling solutions, choppings, sumps, filters, etc. Also included shall be the description of the technical practices used to prevent exceeding the safety control parameters.	WHC-CM-4-46
7.c.(7)	The contractor criticality safety program for nuclear facilities shall include the following requirements: The Criticality Safety section of the SAR shall include (or be included by referring to other sections of the SAR) but not be limited to the following: A description of the installed CAS and emergency procedures, including alarm levels, fail-safe features, response time of devices, and frequency of evacuation drills. Pertinent documents shall show the location of all detectors, their distance to possible sources of criticality, and intervening shielding and audio and visual alarms.	WHC-CM-4-46
7.c.(8)[1]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The Criticality Safety section of the SAR shall include (or be included by referring to other sections of the SAR) but not be limited to the following: A description of the technical practices and measurement control program (including reliability and operability characteristics) used in determining the quantities of fissionable material (or other materials such as soluble poisons to prevent accidental criticality) present in any location and the uncertainties of the measured values.	WHC-CM-4-46
7.c.(8)[2]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The Criticality Safety section of the SAR shall include (or be included by referring to other sections of the SAR) but not to be limited to the following: The measurement control program shall be in accordance with the latest edition of DOE 5700.6C, QUALITY ASSURANCE.	WHC-CM-4-46
7.c.(9)	The contractor criticality safety program for nuclear facilities shall include the following requirements: The Criticality Safety section of the SAR shall include (or be included by referring to other sections of the SAR) but not be limited to the following: An analysis of the spacing of masses of fissionable material within each process area and separation from fissionable material in adjoining areas.	WHC-CM-4-46

Criteria	DOE Order 5480.24, "Nuclear Criticality Safety"	Mandatory
7.d	The contractor criticality safety program for nuclear facilities shall include the following requirements: Contractors shall establish a monitoring and surveillance program to prevent accumulations of fissionable materials in, but not limited to, process equipment and storage, pipe, and ventilation systems. If unsafe accumulations are detected, corrective measures shall be taken to prevent criticality hazards.	WHC-CM-4-29 (Draft Revisions)
7.e.(1)	The contractor criticality safety program for nuclear facilities shall include the following requirements: The requirements of this Order shall apply to all activities where fissionable material is transferred from one operation to another within a facility and from one on-site location to another.	WHC-CM-4-29
7.e.(2)	The contractor criticality safety program for nuclear facilities shall include the following requirements: For on-site transportation, contractors shall be required to follow the guidelines of an approved on-site transportation safety manual.	WHC-CM-4-29
7.e.(3)	The contractor criticality safety program for nuclear facilities shall include the following requirements: The requirements of DOE 5480.3 shall be complied with regarding off-site shipment of fissionable material.	WHC-CM-4-29
7.e.(5)	The contractor criticality safety program for nuclear facilities shall include the following requirements: Fissionable materials shall be defined as either "in process" or "not in process" for facilities that involve both processes and storage. Fissionable material not in process shall be properly stored.	WHC-CM-4-29
7.f.(1)[1]	The contractor criticality safety program for nuclear facilities shall include the following requirements: Contractors shall establish guidelines for permitting fire fighting water or other moderating materials used to suppress fires within or adjacent to moderation controlled areas.	WHC-CM-4-29
7.f.(1)[2]	The contractor criticality safety program for nuclear facilities shall include the following requirements: These guidelines shall be based on comparisons of risk and consequences of accidental criticality with the risks and consequences of postulated fires for the respective area(s).	WHC-CM-4-29 (Draft Revisions)
7.f.(1)[3]	The contractor criticality safety program for nuclear facilities shall include the following requirements: The basis for the guidelines shall be fully documented in a DOE approved Safety Analysis.	WHC-CM-4-46
8.	Contractors shall submit a plan to the Lead PSO for approval to implement the requirements of this Order. Submittal of the implementation plan shall occur within 180 days after the date of issuance of this Order.	Implementation Plan for DOE Orders 5480.21, .22, and .23

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DOE Order 5480.26, Trending and Analysis of Operations Using Performance Indicators

The following Reference(s) have been cited in the attached DOE Order 5480.26, "Trending and Analysis of Operations Using Performance Indicators", Compliance Assessments.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-4, *Corrective Action Management Manual*, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5480.26, "Trending and Analysis of Operations Information Using Performance Indicators"	Mandatory
6.f.(1)	Facility Managers shall assess facility Performance Indicators and other operations information, such as reportable occurrences, for trends in improving or deteriorating conditions.	WHC-CM-1-3
6.f.(1)	Facility Managers shall identify lessons-learned and good practices that can be used to improve facility operations.	WHC-CM-1-3 WHC-CM-1-4
7.a.(1)	Contractors shall provide their PI report addressing the specified list of Performance Indicators, provided in subparagraph c, to the cognizant PSO, through the cognizant Field Organization, on a quarterly basis. For those facilities identified in Appendix 1 of DOE-STD-1048-92, which do not report to a Field Office, their quarterly report should be sent directly to the cognizant PSO.	
7.a.(3)	For each facility included in the DOE PI program, the contractor shall gather, analyze and report the Performance Indicators data, to include narrative data, according to the requirements of this Order and the guidance provided in DOE-STD-1048-92.	
7.a.(4)	The quarterly contractor Performance Indicator reports shall follow the format and content provided in DOE-STD-1048-92.	
7.b.(1)	Contractors for each facility, group of facilities, or site shall review and assess their Performance Indicators and other operations information such as reportable occurrences.	WHC-CM-1-3 WHC-CM-1-4
7.b.(1)	Facility Managers shall assess their facility operating information for trends and indications of deteriorating/improving conditions and identify lessons-learned and good practices that should be used in their facility to prevent occurrences or to improve safety and/or operations.	WHC-CM-1-3 WHC-CM-1-4

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**DOE Order 5483.1A, Occupational Safety and Health Program for
DOE Contractor Employees at Government-owned
Contractor-operated Facilities**

The following Reference(s) have been cited in the attached DOE Order 5483.1A, "Occupational Safety and Health Program for DOE Contractor Employees at Government-owned Contractor-operated Facilities", Compliance Assessment.

WHC-CM-1-1, *Management Policies*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-2, *Quality Assurance Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-3, *Industrial Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-40, *Industrial Hygiene Manual*, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5483.1A, "Occupational Safety and Health Program for DOE Contractor Employees at Government-owned Contractor-operated Facilities"	Mandatory
I.1.a.	As applicable to their work in GOCO facilities, contractors shall comply with the following DOE-prescribed OSHA standards: "Occupational Safety and Health Standards," Title 29 CFR Part 1910.	WHC-CM-4-3
I.1.b.	As applicable to their work in GOCO facilities, contractors shall comply with the following DOE-prescribed OSHA standards: "Safety and Health Regulations for Construction," Title 29 CFR Part 1926.	WHC-CM-4-3
I.1.e.	As applicable to their work in GOCO facilities, contractors shall comply with the following DOE-prescribed OSHA standards: "Occupational Safety and Health Standards for Agriculture," Title 29 CFR Part 1928.	WHC-CM-1-3 WHC-CM-4-40
I.2.	Each contractor shall assure that current copies of DOE-prescribed OSHA standards cited in paragraph 1, above, along with the contractor's own safety and health procedures applicable to the workplace, are available in a place and form reasonably accessible to all employees and their authorized representatives.	WHC-CM-4-3
I.3.[8]	Field organizations, contractors, contractor employees, and representative thereof, whose working conditions would be affected by the standard, shall have the opportunity to review and comment on proposed or temporary standards before their promulgation or amendment as final standards.	WHC-CM-1-3
I.4.a.(1)(a)	A request for a temporary variance shall contain: A specification of the standard from which the contractor seeks a variance.	WHC-CM-1-3
I.4.a.(1)(b)	A request for a temporary variance shall contain: A representation that the contractor is unable to comply with the standard and a detailed statement of the reasons therefor.	WHC-CM-1-3
I.4.a.(1)(c)	A request for a temporary variance shall contain: A statement of the steps the contractor has taken and will take to protect employees from the hazard covered by the standard, to include the conditions the contractor must maintain and the practices, means, methods, operations, and processes which must be adopted and utilized to the extent they provide protection equivalent to that of the standard for which the variance is requested.	WHC-CM-1-3
I.4.a.(1)(d)[1]	A request for a temporary variance shall contain: A certification that the contractor has informed employees of the application by giving a copy thereof to their authorized representative (where applicable), posting a statement, giving a summary of the request, and specifying where a copy may be examined (e.g., at the place or places where notices to employees are normally posted), and by other appropriate means.	WHC-CM-1-3
I.4.a.(1)(d)[2]	A description of how employees have been informed shall be contained in the certification.	WHC-CM-1-3
I.4.a.(1)(d)[3]	The information to employees also shall inform them that they may comment on the request to the appropriate CO or CO representative.	WHC-CM-1-3
I.4.a.(1)(e)	A request for a temporary variance shall contain: A statement of when the contractor will be able to comply with the standard and what steps have been taken and will be taken by the contractor to come into compliance with the standard.	WHC-CM-1-3
I.4.a.(3)[1]	A temporary variance may be in effect for no longer than the period needed by the contractor to achieve compliance with the standard or 1 year, whichever is shorter, except that in unusual circumstances (e.g., lack of programmatic funding) such a temporary variance may be renewed not more than once.	WHC-CM-1-3
I.4.a.(3)[2]	Such a renewal also shall be in effect for no longer than 1 year.	WHC-CM-1-3

Criteria	DOE Order 5483.1A, "Occupational Safety and Health Program for DOE Contractor Employees at Government-owned Contractor-operated Facilities"	Mandatory
1.4.a.(3)[3]	An application for renewal must be filed and processed in the manner specified in paragraph 4a(2), above at least 90 days prior to expiration of the temporary variance.	WHC-CM-1-3
1.4.a.(3)[4]	Employees also shall be given an opportunity to review and comment on a request for a renewal, as outlined on page 1-2, paragraph 4a(1)(d).	WHC-CM-1-3
1.4.b.(1)[2]	The request for variance shall contain the same information specified on page 1-2, paragraphs 4a(1)(a)-(d).	WHC-CM-1-3
1.5.a.(1)	All contractor employees shall be instructed by the contractor to: Observe the DOE-prescribed OSHA standards applicable to their work and report promptly to the contractor any condition which may lead to a violation of these standards.	WHC-CM-4-3
1.5.a.(2)	All contractor employees shall be instructed by the contractor to: Report emergencies and respond to warning signals which may be activated in the event of fire, radiation, or other possible emergencies.	WHC-CM-4-3
1.5.b.[1]	All contractor employees shall be instructed by the contractor initially and periodically (at least annually) regarding the requirements outlined by the DOE safety and health poster, DOE Forms 5480.2 and 5480.3 or Doe Forms EV-632 and EV-632S, as appropriate.	WHC-CM-1-3
1.5.c.	All contractor employees shall be fully informed (at least annually) by the contractor of their rights, protections, and obligations, which include nondiscrimination; the filing of complaints; availability of the DOE-prescribed OSHA standards, and of complaint form DOE F 5480.4 (Attachment 11-1); and accompaniment of the DOE inspector during the conduct of compliance inspections or during the conduct of inspections based on the filing of complaints.	WHC-CM-1-3 WHC-CM-4-3
1.5.d.[1]	All contractor employees shall be informed that the contractor is required to monitor the employee's workplace for radiation exposure and known toxic materials or harmful physical agents which are used or produced at the GOCO facility, and to maintain records of the data as required by Title 29 CFR Part 1910.20, "Access to Employee Exposure and Medical Records."	WHC-CM-4-3
1.5.d.[2]	Employees or their authorized representatives are to be provided with an opportunity to observe monitoring or measuring for toxic materials and harmful physical agents and to have access to the results thereof.	WHC-CM-1-3 WHC-CM-4-40
1.5.d.[3]	Each employee or former employee or representative thereof, within 15 days of a written request, shall be provided access to or copies of any records of cumulative recorded occupational radiation dose or any monitoring or bioassay records relevant to potential exposure to toxic materials or harmful physical agents during employment.	WHC-CM-1-3 WHC-CM-4-40
1.5.d.[4]	Employees will be notified of any information indicating that a radiation dose or an exposure to toxic materials or harmful physical agents may have exceeded the limits specified by the DOE-prescribed OSHA standards.	WHC-CM-1-3 WHC-CM-4-40
1.5.e.	All contractor employees or former employees shall have access to their personal safety, health, and medical records consistent with the provisions of the Freedom of Information Act and the Privacy Act.	WHC-CM-1-3
1.6.b.[3]	The contractor shall provide such assistance and information as may be required by the inspector to aid in the inspection.	WHC-CM-1-1

Criteria	DOE Order 5483.1A, "Occupational Safety and Health Program for DOE Contractor Employees at Government-owned Contractor-operated Facilities"	Mandatory
1.6.e.[4]	The field organization and the contractor shall assure that the matter is investigated and that prompt actions are taken to preclude recurrence of a similar imminent danger situation.	WHC-CM-1-3 WHC-CM-4-2
1.6.f.[4]	The contractor shall notify the CO or CO representative in writing as soon as practicable, but not later than 30 days after receipt of the written findings, of the planned or completed abatement actions taken in response to the notice of the violation(s).	WHC-CM-1-3
1.6.f.[5]	Copies of the notice of violation(s) shall be posted conspicuously by the contractor in the general area of the violation for a period of 5 working days or until the violation is corrected, whichever is longer.	
1.6.g.[1]	In a situation where a contractor is unable to correct a violation or comply with the standards in a reasonable length of time due to funding limitations or other DOE-imposed restrictions, the contractor shall provide the CO or CO representative with full details and an alternate plan to provide safety and health protection equivalent to that provided by the standard(s) during the period of noncompliance.	WHC-CM-1-3
11.1.c.[2]	Oral complaints shall be recorded on DOE F 5480.4 by DOE and/or the Contractor.	WHC-CM-4-3
11.3.a.[1]	Any employee or authorized representative of employees who believes that an imminent danger exists, shall bring this matter to the attention of the appropriate contractor, supervisor, or designated official.	WHC-CM-1-3 WHC-CM-4-3
11.3.a.[2]	If the imminent danger is determined to be valid, the contractor shall take immediate and effective remedial actions to remove employees from the danger area and/or eliminate the danger.	WHC-CM-1-3 WHC-CM-4-3
11.3.a.[3]	The contractor shall conduct an inspection as soon as possible thereafter to assure that appropriate actions have been taken to preclude recurrence of the imminent danger situation.	WHC-CM-1-3
11.4.a.	The contractor shall inform each complainant of the results of the inspection and the actions taken to address and/or correct the safety and health concerns, problems, and/or violations of the DOE-prescribed OSHA standards noted by a complaint filed with the contractor.	WHC-CM-1-3
11.5.[2]	The request must include the pertinent facts and particulars, and the basis for the request (e.g., inadequate action taken on violation of a standard, or no employee or representative allowed to participate in inspection), along with a copy of the original complaint and the field organization's response thereto.	WHC-CM-4-3
111.1.a.	No contractor shall discharge or in any manner demote, reduce in pay, coerce, restrain, threaten or take any other negative actions against any contractor employee as a result of the employee's filing of a complaint, or in any other fashion, exercising on behalf of himself or herself or others any right set forth in this Order.	WHC-CM-1-3
111.2.a.	Contractors subject to the provisions of DOE PR 9-50.704-2(a) shall be responsible for recording and reporting recordable occupational illnesses and injuries, as required by DOE 5484.1, ENVIRONMENTAL PROTECTION, SAFETY, AND HEALTH PROTECTION INFORMATION REPORTING REQUIREMENTS, of 2-24-81.	WHC-CM-1-3
111.2.b.[1]	All contractors shall be responsible for maintaining records of employees' exposures to toxic materials or harmful physical agents, as appropriate.	WHC-CM-4-40
111.2.b.[2]	Such records shall be maintained in perpetuity.	NC

Criteria	DOE Order 5483.1A, "Occupational Safety and Health Program for DOE Contractor Employees at Government-owned Contractor-operated Facilities"	Mandatory
III.2.d.[1]	DOE contractors subject to the provisions of DOE PR 9-50.704-2(a) shall respond to requests for injury/ illness recordkeeping information from the U.S. Department of Labor, Bureau of Labor Statistics, or the Bureau's cooperating State agencies, as appropriate.	WHC-CM-1-1 WHC-CM-1-3
III.2.d.[2]	The information shall be returned to the requestor on OSHA Form 200-S (included with the request) in accordance with the instructions accompanying the request, and a copy thereof shall be provided to the safety and health director of the field organization.	WHC-CM-1-1
III.2.d.[3]	The contractor shall include a statement on the OSHA Form 200-S which states: "With respect to work performed under contract with the DOE at (name of contractor and/or GOCO facility) this employer is not subject to the Occupational Safety and Health Act of 1970, under section 4(b)(1) of that Act."	WHC-CM-1-1
III.3.a.	Each DOE contractor shall post DOE Forms 5480.2 and 5480.3 or DOE Forms EV-632 and EV-632S, as appropriate, and include the information specified.	WHC-CM-4-3
III.3.b.	Each year, from 2-1 until 3-1, DOE contractors subject to the provisions of DOE PR 9-50.704-2(a) shall post a completed DOE Form EV-102A.	
III.3.c.	The required forms shall be posted in a sufficient number of places to permit contractor employees working in or frequenting any portion of GOCO facility to observe the information on the way to or from their place of employment.	WHC-CM-4-3
III.4.	Accident investigations shall be conducted in accordance with DOE 5484.1, ENVIRONMENTAL PROTECTION, SAFETY, AND HEALTH PROTECTION INFORMATION REPORTING REQUIREMENTS, of 2-24-81.	WHC-CM-1-3

DOE Order 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements

The following Reference(s) have been cited in the attached DOE Order 5484.1, "Environmental Protection, Safety, and Health Protection Information Reporting Requirements", Compliance Assessment.

WHC-CM-1-2, *Organizations Charts and Charters*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-6, *WHC Radiological Control Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-3, *Industrial Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5484.1, "Environmental Protection, Safety, and Health Protection Information Reporting Requirements"	Mandatory
II.1.c.[1]	Type C Investigations shall be conducted by Department of Energy contractor personnel when their operations are involved and by Department of Energy personnel when Federal operations are involved.	WHC-CM-1-3
II.1.c.[2]	Standards for these investigations beyond those in this part shall be established by the individual management.	WHC-CM-4-3
II.1.e.(1)[1]	All occupational injuries and illnesses shall be investigated to determine corrective action appropriate to minimize or preclude similar injuries and illnesses.	WHC-CM-4-3
II.1.e.(1)[2]	A report shall be made on Form 5484.3, Supplementary Record of Occupational Injuries and Illnesses, Attachment 1, for occupational illnesses as defined by the Occupational Safety and Health Administration, and for lost work day cases and nonfatal cases without lost work days as defined in 29 CFR 1904.	WHC-CM-1-2 WHC-CM-1-3
II.1.e.(2)[1]	All accidents involving Government-owned, -rented, or -leased vehicles (including Interagency Motor Pool vehicles) or privately owned vehicles while operated on official business shall be investigated and the number of such occurrences reported on Form 5484.4, Tabulation of Property Damage Experience, Attachment 2.	WHC-CM-1-2 WHC-CM-4-3
II.1.e.(2)[2]	The investigation for each accident causing \$250 or more damage and/or injury shall be recorded on SF-91A, Investigation Report of Motor Vehicle Accident, Attachment 3, and copies submitted to the System Safety Development Center (SSDC), EG&G Idaho, Inc., on or before the 25th of the month following the end of the quarter in which the accident occurred.	WHC-CM-1-2 WHC-CM-1-3
II.1.e.(3)[1]	All accidents resulting in Department of Energy or other property damage or loss shall be investigated.	WHC-CM-4-3
II.1.e.(3)[2]	The investigation for each loss exceeding \$1000 shall be recorded on Form 5484.5, Report of Property Damage or Loss, Attachment 4, and copies submitted to the System Safety Development Center (SSDC), EG&G Idaho, Inc., on or before the 25th of the month following the end of the quarter in which the accident occurred.	WHC-CM-1-2 WHC-CM-1-3
II.1.e.(4)(a)	All radiation exposures of individuals which in one calendar quarter exceed the following shall be reported by memo to the Operational and Environmental Safety Division: 3 rem to whole body.	WHC-CM-1-2 WHC-CM-1-3
II.1.e.(4)(b)	All radiation exposures of individuals which in one calendar quarter exceed the following shall be reported by memo to the Operational and Environmental Safety Division: 5 rem to skin of whole body or thyroid.	WHC-CM-1-2 WHC-CM-1-3
II.1.e.(4)(c)	All radiation exposures of individuals which in one calendar quarter exceed the following shall be reported by memo to the Operational and Environmental Safety Division: 10 rem to forearms.	WHC-CM-1-2 WHC-CM-1-3
II.1.e.(4)(d)	All radiation exposures of individuals which in one calendar quarter exceed the following shall be reported by memo to the Operational and Environmental Safety Division: 25 rem to hands or feet.	WHC-CM-1-2 WHC-CM-1-3
II.3.a.	Immediate corrective actions. They are needed since the long range corrective actions resulting from the investigation are usually not transmitted for implementation until 6-8 weeks after the date of the occurrence.	WHC-CM-1-3
IV.3.a.[1]	DOE F 5484.4 "Tabulation of Property Damage Experience," Attachment 2, shall be prepared by each Departmental Element and contractor organization unit.	WHC-CM-1-2 WHC-CM-1-3
IV.3.a.[2]	One copy from each field element, area office, and contractor organizational unit shall be submitted to the System Safety Development Center (SSDC), EG&G Idaho Inc., on or before the 25th of January, April, July, and October.	WHC-CM-1-2 WHC-CM-1-3

Criteria	DOE Order 5484.1, "Environmental Protection, Safety, and Health Protection Information Reporting Requirements"	Mandatory
IV.3.a.[3]	Revisions of reports for each of the 2 preceding calendar years are due 2-28.	WHC-CM-1-2 WHC-CM-1-3
IV.3.b.	Form OSHA-200, "Bureau of Labor Statistics Log and Summary of Occupational Injuries and Illnesses," Attachment 7, shall be completed for Department of Energy contractor employees, and Form OSHA-100F, "Log of Federal Occupational Injuries and Illnesses," Attachment 9, shall be completed for Federal employees and maintained on file for a period of at least 5 years.	WHC-CM-1-2 WHC-CM-1-3
IV.3.c.[1]	Report all recorded external and internal radiation exposures that occur during a visit by Department of Energy Headquarters employees to a field element or contractor facility.	WHC-CM-1-6
IV.3.c.[2]	Complete the appropriate portions of DOE F 5484.8, and submit it to the System Safety Development Center (SSDC), EG&G Idaho, Inc., within 30 days after the individuals's date of visit or within 30 days after his or her exposure has been determined, whichever is later.	
IV.3.d.(1)[1]	Report all positive external and internal radiation exposures recorded for visitors during the period of their visit to a Department of Energy or contractor facility.	WHC-CM-1-6
IV.3.d.(1)[2]	Complete the appropriate portions of DOE F 5484.8 and submit copies of these reports to the visitor's employer (or to the visitor if he or she has no employer) within a period of 30 days after the date of the visitor within 30 days after the visitor's exposure has been determined, whichever is later.	
IV.3.d.(2)[1]	Any radiation exposure in excess of the radiation dose equivalent standards established by DOE 5480.1B, Chapter XI, shall be reported within 24 hours after the exposure or within 24 hours after the exposure has been determined, whichever is later, to the visitor and his employer by telephone or teletype message.	WHC-CM-1-6
IV.3.d.(2)[2]	If the initial report is made by telephone, a written report shall follow within 30 days.	WHC-CM-1-6
IV.3.e.	Preoperational Environmental Survey Reports shall be prepared in accordance with DOE 5400.1, GENERAL ENVIRONMENTAL PROTECTION PROGRAM.	WHC-CM-7-5

DOE Order 5500.2B, Emergency Categories, Classes, and Notification and Reporting Requirements

The following Reference(s) have been cited in the attached DOE Order 5500.2B, "Emergency Categories, Classes, and Notification and Reporting Requirements", Compliance Assessment.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-1, *Emergency Plan*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-43, *Emergency Management Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-44, *Emergency Preparedness Administration*, Westinghouse Hanford Company, Richland, Washington.

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Criteria:	DOE Order 5500.2B, "Emergency Categories, Classes, and Notification and Reporting Requirements"	Mandatory
9.d.[2]	Additionally, this Order does not relieve any DOE facility from notification and reporting requirements legally mandated by, or negotiated with, other Federal, state, tribal, or local agencies. Specifically, the reporting requirements pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), and the Emergency Planning and Community Right-to-Know Act (EPCRA) must be followed.	WHC-CM-1-3 WHC-CM-4-1
10.	These responsibilities and authorities are supplemental to those in DOE5500.1B, although some authorities and responsibilities are repeated for emphasis within the context of this Order.	WHC-CM-4-1
11.a.(2)(a)1	Declaration of an Operational Alert requires the availability of personnel and resources to: Provide continuous assessment of pertinent information for DOE decision makers, offsite authorities, the public, and other appropriate entities;	WHC-CM-4-1 WHC-CM-4-43
11.a.(2)(a)2	Declaration of an Operational Alert requires the availability of personnel and resources to: Conduct appropriate assessments, investigations, or preliminary or confirmatory sampling and monitoring;	WHC-CM-1-3, WHC-CM-4-1 WHC-CM-4-43, WHC-CM-4-44
11.a.(2)(a)3	Declaration of an Operational Alert requires the availability of personnel and resources to: Mitigate the severity of the occurrence or its consequences;	WHC-CM-4-1 WHC-CM-4-43
11.a.(2)(a)4b[1]	Declaration of an Operational Alert requires the availability of personnel and resources to: Non-reactor Facilities. An Alert shall be declared when events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the facility.	WHC-CM-1-3, WHC-CM-4-1 WHC-CM-4-43, WHC-CM-4-44
11.a.(2)(a)4d[1]	Declaration of an Operational Alert requires the availability of personnel and resources to: Safeguards and Security. An Alert shall be declared when events are in progress, have occurred, or are anticipated which could involve an actual or potential substantial degradation in the level of protection of the facility or the loss or possible loss of Special Nuclear Material (SNM).	WHC-CM-4-1
11.a.(2)(a)4d[2]	Declaration of an Operational Alert requires the availability of personnel and resources to: Pre-emergency conditions which warrant increased safeguards and security measures shall be reported in accordance with DOE 5000.3A, Attachment 2, Group 5, procedures for non-emergency occurrences.	WHC-CM-1-3
11.a.(2)(b)4	Declaration of an Operational Site Area Emergency requires initiation of predetermined protective actions for onsite personnel and the notification and assembly of emergency response personnel and equipment to activate response centers to provide: Conduct or assist in any evacuations and sheltering;	WHC-CM-1-3, WHC-CM-4-1 WHC-CM-4-43, WHC-CM-4-44
11.a.(2)(b)5	Declaration of an Operational Site Area Emergency requires initiation of predetermined protective actions for onsite personnel and the notification and assembly of emergency response personnel and equipment to activate response centers to provide: Conduct appropriate assessments, investigations, or sampling and monitoring;	WHC-CM-1-3, WHC-CM-4-1 WHC-CM-4-43, WHC-CM-4-44
11.a.(2)(b)6	Declaration of an Operational Site Area Emergency requires initiation of predetermined protective actions for onsite personnel and the notification and assembly of emergency response personnel and equipment to activate response centers to provide: Mitigate the severity of the actual or potential consequences;	WHC-CM-4-1 WHC-CM-4-43

Criteria	DOE Order 5500.2B, "Emergency Categories, Classes, and Notification and Reporting Requirements"	Mandatory
11.a.(2)(b)7a[1]	Declaration of an Operational Site Area Emergency requires initiation of predetermined protective actions for onsite personnel and the notification and assembly of emergency response personnel and equipment to activate response centers to provide: Reactors. A Site Area Emergency shall be declared when events are in progress or have occurred which involve actual or potential major failures of plant functions necessary for protection of workers and the public.	
11.a.(2)(b)7b[1]	Declaration of an Operational Site Area Emergency requires initiation of predetermined protective actions for onsite personnel and the notification and assembly of emergency response personnel and equipment to activate response centers to provide: Non-reactor Facilities. A Site Area Emergency shall be declared when events are in progress or have occurred which involve actual or likely major failures of facility functions needed for protection of workers and the public.	WHC-CM-1-3, WHC-CM-4-1 WHC-CM-4-43, WHC-CM-4-44
11.a.(2)(b)7d	Declaration of an Operational Site Area Emergency requires initiation of predetermined protective actions for onsite personnel and the notification and assembly of emergency response personnel and equipment to activate response centers to provide: Safeguards and Security. A Site Area Emergency shall be declared when events are in progress or have occurred which involve actual malevolent acts resulting in major failures of protective systems.	WHC-CM-4-1
11.a.(2)(b)7e[1]	Declaration of an Operational Site Area Emergency requires initiation of predetermined protective actions for onsite personnel and the notification and assembly of emergency response personnel and equipment to activate response centers to provide: Transportation. A Site Area Emergency shall be declared when events are in progress or have occurred which involve an actual or potential major reduction in the safety of the shipment.	WHC-CM-4-1
11.a.(2)(c)1	Declaration of an Operational General Emergency requires the notification, mobilization, and dispatch of all appropriate emergency response personnel and equipment including appropriate DOE national response assets to: Activate the response centers and other emergency assets to provide continuous assessment of information;	WHC-CM-1-3, WHC-CM-4-1 WHC-CM-4-43, WHC-CM-4-44
11.a.(2)(c)2	Declaration of an Operational General Emergency requires the notification, mobilization, and dispatch of all appropriate emergency response personnel and equipment including appropriate DOE national response assets to: Establish communications, consultation, and liaison with offsite authorities and recommend predetermined protective actions for the public;	WHC-CM-4-1
11.a.(2)(c)3	Declaration of an Operational General Emergency requires the notification, mobilization, and dispatch of all appropriate emergency response personnel and equipment including appropriate DOE national response assets to: Provide information to the public through offsite authorities and the media;	WHC-CM-4-1
11.a.(2)(c)4	Declaration of an Operational General Emergency requires the notification, mobilization, and dispatch of all appropriate emergency response personnel and equipment including appropriate DOE national response assets to: Conduct or assist evacuations and sheltering;	WHC-CM-1-3, WHC-CM-4-1 WHC-CM-4-43, WHC-CM-4-44
11.a.(2)(c)5	Declaration of an Operational General Emergency requires the notification, mobilization, and dispatch of all appropriate emergency response personnel and equipment including appropriate DOE national response assets to: Conduct appropriate assessments, investigations, or sampling and monitoring;	WHC-CM-1-3, WHC-CM-4-1 WHC-CM-4-43, WHC-CM-4-44
11.a.(2)(c)6	Declaration of an Operational General Emergency requires the notification, mobilization, and dispatch of all appropriate emergency response personnel and equipment including appropriate DOE national response assets to: Mitigate the severity of the actual or potential consequences;	WHC-CM-4-1 WHC-CM-4-43

Criteria	DOE Order 5500.28, "Emergency Categories, Classes, and Notification and Reporting Requirements"	Mandatory
11.a.(2)(c)7	Declaration of an Operational General Emergency requires the notification, mobilization, and dispatch of all appropriate emergency response personnel and equipment including appropriate DOE national response assets to: Mobilize and dispatch appropriate emergency response groups or security forces.	WHC-CM-4-1 WHC-CM-4-43
11.a.(2)(c)7b	Declaration of an Operational General Emergency requires the notification, mobilization, and dispatch of all appropriate emergency response personnel and equipment including appropriate DOE national response assets to: Non-Reactor Facilities. A General Emergency shall be declared when events are in progress or have occurred which involve actual or imminent catastrophic reduction of facility safety systems with potential for loss of containment or confinement integrity, (e.g., release of large quantities of hazardous materials to the environs) and/or release of hazardous materials (radiological or non-radiological) that can reasonably be expected to exceed appropriate PAG or ERPG exposure levels offsite.	WHC-CM-1-3 WHC-CM-4-1 WHC-CM-4-43 WHC-CM-4-44
11.a.(2)(c)7d	Declaration of an Operational General Emergency requires the notification, mobilization, and dispatch of all appropriate emergency response personnel and equipment including appropriate DOE national response assets to: Safeguards and Security. A General Emergency shall be declared when events are in progress or have occurred which involve malevolent action resulting in catastrophic degradation of protection systems that could lead to substantial offsite impacts.	WHC-CM-4-1
11.a.(2)(c)7e[1]	Declaration of an Operational General Emergency requires the notification, mobilization, and dispatch of all appropriate emergency response personnel and equipment including appropriate DOE national response assets to: Transportation. A General Emergency shall be declared when events have occurred which involve an actual or imminent catastrophic reduction in the safety of the shipment.	WHC-CM-4-1
12.	All communications concerning an emergency shall be reviewed for classified information and unclassified controlled nuclear information prior to transmittal and shall be protected accordingly.	WHC-CM-4-1
12.b.(2)(a)	Heads of Field Elements shall ensure that: The Manager/Administrator of each DOE- or contractor-operated facility shall: Concurrently notify the HQ EOC and the Field Element of the emergency as soon as crucial information is available but no later than 15 minutes after categorization of the event as an Emergency;	WHC-CM-4-1
12.b.(2)(b)	Heads of Field Elements shall ensure that: The Manager/Administrator of each DOE- or contractor-operated facility shall: Concurrently notify the HQ EOC and the Field Element of all changes in the emergency class within 15 minutes of the redesignation;	WHC-CM-4-1
12.b.(2)(d)	Heads of Field Elements shall ensure that: The Manager/Administrator of each DOE- or contractor-operated facility shall: Provide written reports concerning the emergency event as soon as practical but within 24 hours of event categorization;	WHC-CM-1-3 WHC-CM-4-1
12.b.(2)(e)[1]	Heads of Field Elements shall ensure that: The Manager/Administrator of each DOE- or contractor-operated facility shall: Notify appropriate regional Federal, state, tribal, and local agencies in accordance with the approved emergency plans and procedures and appropriate memoranda of understanding or other written agreements.	WHC-CM-4-1
12.b.(2)(e)[2]	Heads of Field Elements shall ensure that: The Manager/Administrator of each DOE- or contractor-operated facility shall: Verbal notifications shall be made within 15 minutes of the categorization of the event as an emergency.	WHC-CM-4-1

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DOE Order 5500.3A, DOE Planning and Preparedness for Operational Emergencies

The following Reference(s) have been cited in the attached DOE Order 5500.3A, "DOE Planning and Preparedness for Operational Emergencies", Compliance Assessment.

WHC-CM-1-2, *Organizations Charts and Charters*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-1, *Emergency Plan*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-33, *Security Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-43, *Emergency Management Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-44, *Emergency Preparedness Administration*, Westinghouse Hanford Company, Richland, Washington.

WHC-IP-0628, *Facility Drill Guide*, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5500.3A, "DOE Planning and Preparedness for Operational Emergencies"	Mandatory
10.e.(8)(a)	The Heads of DOE Field Elements shall: Ensure that the Manager/Administrator of each DOE- or contractor- operated facility, as the first or operating level of the line management structure, shall: Develop, implement, and maintain an emergency management program commensurate with the facility's potential hazards.	WHC-CM-1-2, WHC-CM-4-1 WHC-CM-4-43, WHC-CM-4-44
10.e.(8)(b)	The Heads of DOE Field Elements shall: Ensure that the Manager/Administrator of each DOE- or contractor-operated facility, as the first or operating level of the line management structure, shall: Perform and document hazards assessments.	WHC-CM-4-1
10.e.(8)(c)	The Heads of DOE Field Elements shall: Ensure that the Manager/Administrator of each DOE- or contractor-operated facility, as the first or operating level of the line management structure, shall: Schedule a continuing program of emergency management drills and exercises.	WHC-CM-4-1 WHC-CM-4-43
10.e.(8)(d)	The Heads of DOE Field Elements shall: Ensure that the Manager/Administrator of each DOE- or contractor-operated facility, as the first or operating level of the line management structure, shall: Conduct assessments of their emergency management program to verify compliance with DOE directives and policy.	WHC-CM-4-1 WHC-CM-4-44
11.a.[1]	As part of the EMS, DOE elements and DOE contractors shall establish and maintain emergency management programs consisting of plans and procedures for response to Operational Emergencies involving or affecting DOE facilities, including DOE transportation activities.	WHC-CM-1-2, WHC-CM-4-1 WHC-CM-4-43, WHC-CM-4-44
11.a.[2]	These emergency management programs must be commensurate with the assessment of potential hazards and targets and must include the following elements: Emergency Response Organization, Offsite Response Interfaces, Operational Emergency Event Classes, Notification, Consequence Assessment, Protective Actions, Medical Support, Recovery and Reentry, Public Information, Emergency Facilities and Equipment, Training, Drills and Exercises, and Program Administration.	WHC-CM-4-1
11.a.[3]	Further, DOE elements and the managers/ administrators of DOE- or contractor operated facilities shall establish Emergency Readiness Assurance Programs, as set forth in DOE 5500.10.	WHC-CM-4-1
11.a.[4]	DOE emergency management programs must comply with, but are not limited to, the requirements for hazards assessment, program elements, and documentation set forth in this Order.	WHC-CM-4-1, WHC-CM-4-43 WHC-CM-4-44
11.b.(1)[1]	A hazards assessment shall be prepared and maintained for each facility and shall be used for emergency planning purposes.	WHC-CM-4-1
11.b.(1)[2]	This hazards assessment provides the technical basis for the emergency management program and shall include information sufficient to determine the scope and extent of the program elements comprising the emergency management program for the respective facility.	WHC-CM-4-1
11.b.(1)[3]	This hazards assessment shall be derived from information provided by the assessment of the potential hazards and targets and will be performed in compliance with existing DOE requirements.	WHC-CM-4-1
11.b.(1)[4]	The use of vulnerability and target analyses may include sensitive or classified information which will need special handling.	WHC-CM-4-33
11.b.(2)[1]	The hazards assessment shall consider the broad range of emergency events that could affect the facility.	WHC-CM-4-1

Criteria	DOE Order 5500.3A, "DOE Planning and Preparedness for Operational Emergencies"	Mandatory
11.b.(2)(2)	The hazards assessment shall include descriptions of those hazards relevant to potential Operational Emergencies and characterizations of the potential consequences on workers, the public, and the environment.	WHC-CM-4-1
11.b.(2)(3)	For each potential Operational Emergency considered, the assessment must address the determination of initiating events, accident mechanisms, equipment or system failures, event indications, contributing events, source terms, material release characteristics, topography, environmental transport and diffusion, and exposure considerations.	WHC-CM-4-1
11.b.(3)(1)	Assumptions, methodology, models, and evaluation techniques used in the hazards assessment shall be fully documented.	WHC-CM-4-1
11.b.(3)(2)	Also, the hazards assessment shall include a determination of the size of the EPZ, i.e., the area surrounding the facility for which special planning and preparedness efforts are required to ensure that prompt and effective protective actions can be taken to minimize the risk to workers, the general public, and the environment.	WHC-CM-4-1
11.b.(4)(2)	The emergency response plan must be responsive to this full spectrum of accidents.	WHC-CM-4-1
11.c.(1)(1)	All DOE emergency management programs must include, as a minimum, the following program elements: Emergency Response Organization. An element with clearly specified authorities and responsibilities for emergency response and mitigation which must be established and maintained for each facility.	WHC-CM-4-1 WHC-CM-4-43
11.c.(1)(2)	It must have overall responsibility for the initial and ongoing response to, and mitigation of, an emergency...	WHC-CM-4-1 WHC-CM-4-43
11.c.(1)(a)	Emergency Response Organization must: Perform, but not be limited to, the following functions: event categorization, determination of the emergency class, notification, provision of protective action recommendations, management and decision making, control of onsite emergency activities, consequence assessment, protective actions, medical support, public information, activation and coordination of onsite response resources, security, communications, administrative support, and coordination and liaison with offsite support and response organizations.	WHC-CM-4-1 WHC-CM-4-43
11.c.(1)(b)	Emergency Response Organization must: Consist of an adequate number of experienced and trained personnel, including designated alternates, for timely performance of the functions identified above.	WHC-CM-4-1
11.c.(1)(c)	Emergency Response Organization must: Assign emergency response responsibilities and tasks to specific individuals identified by name, title, or position.	WHC-CM-4-1
11.c.(1)(d)	Emergency Response Organization must: Integrate local agencies and organizations which would be relied upon to provide onsite response services and include those contractor and private organizations that may be relied upon to provide specialized expertise and assistance to all emergency planning, preparedness, and readiness assurance activities.	WHC-CM-4-1
11.c.(2)(1)	Offsite Response Interfaces. Provisions must be in place for interface and coordination with Federal, state, tribal, and local agencies and organizations responsible for offsite emergency response and for protection of the environment and the health and safety of the public.	WHC-CM-4-1

Criteria	DOE Order 5500.3A, "DOE Planning and Preparedness for Operational Emergencies"	Mandatory
11.c.(2)[2]	Offsite Response Interfaces. Where possible, interrelationships with Federal, state, tribal, and local organizations must be prearranged and documented in formal plans, agreements, understandings, and/or other pre-arrangements for mutual assistance which detail the emergency measures to be provided by non-assistance which detail the emergency measures to be provided by non-DOE entities.	WHC-CM-4-1
11.c.(3)[1]	Operational Emergency Event classes. Operational Emergencies involving or affecting DOE facilities must be characterized as one of the Operational Emergency classes (e.g., Alert, Site Area Emergency, or General Emergency) in accordance with DOE 5500.2B.	WHC-CM-4-1
11.c.(3)[2]	Operational Emergency Event Classes. EALs, the specific criteria used to recognize and categorize events, must be developed for the spectrum of potential Operational Emergencies identified by the hazards assessment.	WHC-CM-4-1 WHC-CM-4-43
11.c.(3)[3]	Operational Emergency Event Classes. EAL initiating conditions (i.e., individual instrument readings, equipment status, valve positions, parameter values, onsite and/or offsite monitor readings, etc.) must be specifically identified in procedures and must be observable and recognizable in a timely manner by responsible personnel.	WHC-CM-4-1 WHC-CM-4-43
11.c.(4)[1]	Notification and communication of emergency information must be consistent with the requirements of DOE 5000.3A and 5500.2B.	WHC-CM-1-3, WHC-CM-4-1 WHC-CM-4-43
11.c.(4)[2]	Provisions must be in place for prompt initial notification of emergency response personnel and response organizations, including appropriate DOE elements and other Federal, state, tribal, and local organizations, and for continuing effective communication among the response organizations throughout an emergency.	WHC-CM-1-3 WHC-CM-4-1 WHC-CM-4-43
11.c.(4)[3]	Notification. The content and format of the initial notification and follow-up messages must be prearranged and standardized in the emergency plan.	WHC-CM-4-1 WHC-CM-4-43
11.c.(4)[4]	Notification. The handling of classified and/or controlled information during an emergency must be in accordance with established procedures and DOE requirements.	WHC-CM-4-33
11.c.(5)(a)	Consequence Assessment. Provisions must be in place to adequately assess the actual or potential onsite and offsite consequences of an emergency and must include: Timely initial assessment of the actual or potential consequences of an emergency and continuous, in-depth assessment of events throughout an emergency.	WHC-CM-1-3 WHC-CM-4-1 WHC-CM-4-43
11.c.(5)(b)	Consequence Assessment. Provisions must be in place to adequately assess the actual or potential onsite and offsite consequences of an emergency and must include: Integration of the consequence assessment process with the process for categorization of an event as an emergency, determination of the appropriate emergency class, and protective action decision making, including projections of onsite and offsite consequences.	WHC-CM-1-3 WHC-CM-4-1 WHC-CM-4-43
11.c.(5)(c)	Consequence Assessment. Provisions must be in place to adequately assess the actual or potential onsite and offsite consequences of an emergency and must include: Monitoring and evaluation of the specific indicators necessary to continually assess the consequences of emergency events and to monitor safety, health, environmental, and security conditions which may affect or exacerbate the emergency.	WHC-CM-1-3 WHC-CM-4-1 WHC-CM-4-43

Criteria	DOE Order 5500.3A, "DOE Planning and Preparedness for Operational Emergencies"	Mandatory
11.c.(5)(d)	Consequence Assessment. Provisions must be in place to adequately assess the actual or potential onsite and offsite consequences of an emergency and must include: Coordination with Federal, state, tribal, and local organizations to locate and track hazardous materials released to the environment; estimate the integrated impact of such release on the public and the environment; and locate and recover materials, especially those with national security implications.	WHC-CM-4-1 RLEP2.3
11.c.(6)	Provisions must be in place for specific, predetermined actions to be taken in response to emergency conditions to protect onsite personnel and the public...	WHC-CM-4-1
11.c.(6)(a)	Protective Actions...must include: Protective Action Guides (PAGs) and Emergency Response Planning Guidelines (ERPGs), prepared in conformance with DOE approved guidance applicable to the actual or potential release of hazardous materials to the environment for use in protective action decision making.	WHC-CM-4-1
11.c.(6)(b)	Protective Actions...must include: Control, monitoring, and maintenance of records of onsite personnel exposures to hazardous materials.	WHC-CM-4-1
11.c.(6)(c)	Protective Actions...must include: Accountability for all facility personnel, within 30 minutes (not to exceed 45 minutes) of emergency determination, and timely sheltering and/or evacuation of workers, to include predetermined criteria, procedures, assembly areas, transportation methods, and routes.	WHC-CM-4-1 WHC-CM-4-43
11.c.(6)(d)	Protective Actions...must include: Radiological and/or hazardous material decontamination of workers and equipment evacuated from the site.	WHC-CM-4-1
11.c.(6)(e)	Protective Actions...must include: Determination of the area surrounding the specific facility actually affected by an Operational Emergency.	WHC-CM-4-1
11.c.(6)(f)	Protective Actions...must include: Timely recommendation to appropriate state, tribal, or local authorities of protective actions, such as sheltering and/or evacuation, for the general public.	WHC-CM-4-1
11.c.(7)(a)	Medical Support. Provisions must be in place for medical support for workers, including those with radiological and/or hazardous material contamination, and must include: Immediate, onsite first aid and emergency medical treatment capability.	WHC-CM-4-1
11.c.(7)(b)	Medical Support. Provisions must be in place for medical support for workers, including those with radiological and/or hazardous material contamination, and must include: Transportation of injured onsite personnel to onsite or offsite medical facilities, as appropriate.	WHC-CM-4-1
11.c.(7)(c)	Medical Support. Provisions must be in place for medical support for workers, including those with radiological and/or hazardous material contamination, and must include: Documented arrangements with onsite and offsite medical facilities to accept and treat contaminated, injured personnel.	WHC-CM-4-1
11.c.(8)	Provisions must be made for recovery from an Operational Emergency and reentry into the affected facility.	WHC-CM-4-1 WHC-CM-4-43

Criteria	DOE Order 5500.3A, "DOE Planning and Preparedness for Operational Emergencies"	Mandatory
11.c.(8)(a)	The approach and general procedures for recovery include: decision making and communications associated with termination of an emergency; dissemination of information to Federal, state, tribal, and local organizations regarding the emergency and relaxation of public protective actions; establishment of a recovery organization; and establishment of general criteria for resumption of normal operations.	WHC-CM-4-1 WHC-CM-4-43
11.c.(8)(b)	The means must exist for estimating dosage and for protecting workers and the general public from hazardous exposure during recovery and reentry activities.	WHC-CM-4-1, WHC-CM-4-43
11.c.(9)	An emergency public information program, consistent with DOE 5500.4 must be established and integrated into the emergency management program...	WHC-CM-4-1
11.c.(9)(a)	Public Information...must include: Methods and procedures for the timely release of accurate information regarding an emergency to the news media and the coordination of this information within DOE and with other Federal, state, tribal, and local response organizations.	WHC-CM-4-1
11.c.(9)(b)	Public Information...must include: A designated spokesperson and staff able to access emergency information; exchange information with spokespersons of Federal, state, tribal, and local organizations; disseminate information to the news media; and manage public inquiries.	WHC-CM-4-1
11.c.(9)(c)	Public Information...must include: A predesignated facility to accommodate members of the news media and to facilitate the coordination of press releases.	WHC-CM-4-1
11.c.(9)(d)	Public Information...must include: An ongoing public information program, operated in conjunction with state, tribal, and local governments and the news media, to distribute realistic planning information on an appropriate basis that describes an emergency and includes sources of public information, evacuation routes, sheltering recommendations, etc.	WHC-CM-4-1
11.c.(10)(a)[1]	Emergency Facilities and Equipment. Facilities and equipment, adequate to support emergency response, must be established and maintained as follows: An EOC must be established from which the emergency response organization assesses, evaluates, coordinates, and directs emergency response activities and communicates within DOE and with other Federal, state, tribal, and local response organizations.	WHC-CM-4-1 WHC-CM-4-43
11.c.(10)(a)[2]	Additional emergency facilities must be designated commensurate with the scope and characteristics of response activities.	
11.c.(10)(b)	Emergency Facilities and Equipment. Facilities and equipment, adequate to support emergency response, must be established and maintained as follows: The staffing, operation, and response activities pertaining to the EOC, and each additional emergency facility, must be predetermined and documented in procedures for a timely and coordinated overall emergency response. The EOC must be habitable following an emergency or an alternate EOC must be available if the primary EOC becomes uninhabitable.	WHC-CM-4-1 WHC-CM-4-43
11.c.(10)(c)	Emergency Facilities and Equipment. Facilities and equipment, adequate to support emergency response, must be established and maintained as follows: Primary and backup means of communications must be available and capable of operating with other DOE elements, and with other Federal, state, tribal, and local response organizations.	WHC-CM-4-1

Criteria	DOE Order 5500.3A, "DOE Planning and Preparedness for Operational Emergencies"	Mandatory
11.c.(10)(d)	Emergency Facilities and Equipment. Facilities and equipment, adequate to support emergency response, must be established and maintained as follows: Adequate equipment and supplies must be available and operable for emergency response personnel to carry out their respective duties and responsibilities.	WHC-CM-4-1
11.c.(11)	General training must be provided to all workers regarding Operational Emergencies and specialized training must be conducted for all workers and be available to all regional Federal, state, tribal, and local emergency response organizations...	WHC-CM-4-1 WHC-CM-4-44
11.c.(11)(a)	Training must be provided annually to workers who may have to take protective actions in the event of an emergency.	WHC-CM-4-1
11.c.(11)(b)	A formal training program must be in place for the instruction and qualification of all personnel (i.e., primary and alternate) comprising the facility emergency response organization to include initial training and annual retraining for both onsite and offsite incidents, including transportation incidents.	WHC-CM-4-1
11.c.(11)(b)1	All training must be systematic and performance based, i.e., based on an analysis of tasks to be performed during an emergency, and developed with performance objectives, emphasis on team training, and facility-specific emergency response scenarios.	WHC-CM-4-1 WHC-CM-4-44
11.c.(11)(b)2	Annual retraining shall include training on weaknesses detected during drills and exercises, changes to plans and procedures, and lessons learned from emergencies at DOE and other industrial facilities.	WHC-CM-4-1
11.c.(11)(c)	Offsite state, tribal, and local emergency response organizations must be offered facility-specific orientation training and information on hazards and emergency response annually. Information on hazards and emergency response must also be provided to the media and the public, as appropriate.	WHC-CM-4-1
11.c.(12)(a)[1]	A coordinated program of drills and exercises must be an integral part of the emergency management program as follows: Drills must be used to develop and maintain personnel skills, expertise, and response capability.	WHC-CM-4-1 WHC-CM-4-43 WHC-IP-0628
11.c.(12)(a)[2]	A coordinated program of drills and exercises must be an integral part of the emergency management program as follows: Drills must be of sufficient scope and frequency to ensure adequate response capability in all applicable areas.	WHC-CM-4-1 WHC-CM-4-43 WHC-IP-0628
11.c.(12)(a)[3]	A coordinated program of drills and exercises must be an integral part of the emergency management program as follows: Drills must include emergency response activities such as notification, emergency communication, fire, medical emergencies, hazardous material detection and monitoring, environmental sampling and analyses, security, personnel accountability, evacuation, emergency categorization, weapons handling, decontamination, facility activation, public information, and health physics.	WHC-CM-4-1 WHC-CM-4-43 WHC-IP-0628
11.c.(12)(a)[4]	A coordinated program of drills and exercises must be an integral part of the emergency management program as follows: There must be at least one drill per year to train in notification and emergency communications with regional Federal, state, tribal, and local authorities and DOE HQ.	WHC-CM-4-1

Criteria	DOE Order 5500.3A, "DOE Planning and Preparedness for Operational Emergencies"	Mandatory
11.c.(12)(b)1[1]	A full participation exercise shall be conducted annually for at least one facility on each DOE site to test and demonstrate an integrated emergency response capability.	WHC-CM-4-1 WHC-CM-4-43
11.c.(12)(b)1[2]	For multiple-facility sites, the basis of the exercise scenario shall be rotated among those facilities with EPZs extending offsite.	WHC-CM-4-1 WHC-CM-4-43
11.c.(12)(b)3[1]	Full participation exercises shall require the full participation of HQ and Field Elements.	WHC-CM-4-1
11.c.(12)(b)3[2]	Federal, state, tribal, and local regulatory and/or emergency response organization participation shall be requested.	WHC-CM-4-1
11.c.(12)(b)3[3]	When these groups respond affirmatively, they shall be accommodated.	WHC-CM-4-1
11.c.(12)(b)4	A control group shall be established for each exercise to ensure that events occur which address the objectives of the exercise.	WHC-CM-4-1 WHC-CM-4-43
11.c.(12)(b)5	An evaluation group shall be established for each exercise to assess the performance of the exercise participants against the objectives.	WHC-CM-4-1 WHC-CM-4-43
11.c.(12)(b)6	A critique process shall be conducted for each exercise to provide initial impressions of accomplishments and shortcomings discovered during the exercise.	WHC-CM-4-1 WHC-CM-4-43
11.c.(12)(c)	Drills and exercises must be conducted in a manner which emphasizes facility-specific emergency events and response activities and which minimizes the use of generic, nonspecific simulations.	WHC-CM-4-1 WHC-CM-4-43
11.c.(12)(d)	Each member of the emergency response organization shall participate in a drill or exercise at least annually to demonstrate proficiency in assigned response duties and responsibilities.	WHC-CM-4-1
11.c.(12)(e)	Emergency management improvements and corrective actions identified during actual emergencies or during drills and exercises must be incorporated into the emergency management program.	WHC-CM-4-1
11.c.(13)	Program Administration. Provisions must be in place for the continued administration of the emergency management program...	WHC-CM-1-2 WHC-CM-4-1
11.c.(13)(a)[1]	Each PSO, each Head of Field Element, and each contractor facility subject to this Order shall designate an individual to administer the emergency management program for their program, Field Element, or facility.	WHC-CM-4-1
11.c.(13)(a)[2]	This individual's responsibilities shall include development and maintenance of the emergency plan, development of the Emergency Readiness Assurance Plan (ERAP) and annual updates, development and conduct of training and exercise programs, coordination of assessment activities, development of related documentation, and coordination of emergency resources.	WHC-CM-4-1
11.c.(13)(b)	The emergency plan and implementing procedures shall be controlled distribution documents and shall be annually reviewed and updated.	WHC-CM-4-1
11.c.(13)(c)	An internal assessment of all aspects of the emergency management program must be conducted annually by persons not directly responsible for administration of the program or response activity being assessed.	WHC-CM-4-1 WHC-CM-4-44

Criteria	DOE Order 5500.3A, "DOE Planning and Preparedness for Operational Emergencies"	Mandatory
11.d.(1)	Documentation. PSOs, Heads of Field Elements, and all managers/administrators of a DOE- or contractor-operated facility shall develop and maintain an emergency plan and associated procedures to document their emergency management program. These documents must be controlled distribution documents. The documentation shall include: An emergency plan which describes the provisions for response to an operational emergency.	WHC-CM-4-1 WHC-CM-4-43 WHC-CM-4-44
11.d.(1)(a)	The plan must contain information to describe each element of the emergency management program, describe the overall picture of emergency response capabilities, and include material necessary for the understanding of the plans. The emergency plan must reference procedures and supporting material which may be used by emergency response personnel.	WHC-CM-4-1 WHC-CM-4-43 WHC-CM-4-44
11.d.(1)(b)	The emergency plan must describe the EPZs applicable to the facility to include topographical features, demographic information, transportation routes, land use, major industrial facilities, public facilities, and jurisdictional boundaries.	WHC-CM-4-1
11.d.(1)(c)[1]	The emergency plan must be consistent with other plans for similar DOE facilities and coordinated and compatible with other applicable DOE, Federal, state, tribal, and local emergency plans.	WHC-CM-4-1
11.d.(1)(c)[2]	The emergency plan must integrate the response plans for specific incidents.	WHC-CM-4-1
11.d.(2)(a)	Procedures must consist of special emergency plan implementing procedures... as well as other procedures currently in use...which would be utilized in, or associated with, emergency response activities.	WHC-CM-4-1 WHC-CM-4-43 WHC-CM-4-44
11.d.(2)(b)[1]	Procedures must be consistent and compatible with the emergency plan. Emergency procedures must contain the detailed information and the specific instructions needed to carry out the emergency plan during a drill, exercise, or actual emergency.	WHC-CM-4-1 WHC-CM-4-43 WHC-CM-4-44
11.d.(2)(b)[2]	Emergency procedures must contain the detailed information and the specific instructions needed to carry out the emergency plan during a drill, exercise or actual emergency.	WHC-CM-4-1, WHC-CM-4-43 WHC-CM-4-44
11.d.(2)(b)[3]	Procedures must clearly and concisely identify the individual(s) responsible for performance of response activities and delineate the specific actions steps to be performed.	WHC-CM-4-1, WHC-CM-4-43 WHC-CM-4-44
11.d.(2)(b)[4]	Procedures must identify the relevant prerequisites and precautions associated with the response actions.	WHC-CM-4-1, WHC-CM-4-43 WHC-CM-4-44
11.d.(3)[1]	Emergency records which contain information for review and reconstruction of major communications and actions taken during an reconstruction of major communications and actions taken during an emergency. These records shall be maintained by the individual responsible for program administration.	WHC-CM-4-1 WHC-CM-4-43
11.d.(3)[2]	These records shall be maintained by the individual responsible for program administration.	WHC-CM-4-1, WHC-CM-4-43

DOE Order 5700.6C, Quality Assurance

The following Reference(s) have been cited in the attached DOE Order 5700.6C, "Quality Assurance", Compliance Assessment.

WHC-CM-1-1, *Management Policies*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-2, *Organizations Charts and Charters*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-2, *Quality Assurance Manual*, Westinghouse Hanford Company, Richland, Washington.

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Criteria	DOE Order 5700.6C, "Quality Assurance"	Mandatory
9.a.(6) 1	Programs, guides, and policies which implement this Order shall meet the requirements of DOE 1324.2A.	
9.b.(1)(a)[1]	Organizations shall develop, implement, and maintain a written Quality Assurance Program.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(1)(a)[2]	The QAP shall describe the organizational structure, functional responsibilities, levels of authority, and interfaces for those managing, performing, and assessing adequacy of work.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(1)(a)[3]	The QAP shall describe the management system, including planning, scheduling, and cost control considerations.	WHC-CM-1-1, WHC-CM-1-3; WHC-CM-4-2
9.b.(1)(b)[1]	Personnel shall be trained and qualified to ensure they are capable of performing their assigned work.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(1)(b)[2]	Personnel shall be provided continuing training to ensure that job proficiency is maintained.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(1)(c)[1]	The organization shall establish and implement processes to detect and prevent quality problems and to ensure quality improvement.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(1)(c)[2]	Items and processes that do not meet established requirements shall be identified, controlled, and corrected.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(1)(c)[3]	Correction shall include identifying the causes of problems and preventing recurrence.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(1)(c)[4]	Item reliability, process implementation, and other quality-related information shall be reviewed and the data analyzed to identify items and processes needing improvement.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(1)(d)[1]	Documents shall be prepared, reviewed, approved, issued, used, and revised to prescribe processes, specify requirements, or establish design.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(1)(d)[2]	Records shall be specified, prepared, reviewed, approved, and maintained.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(a)[1]	Work shall be performed to establish technical standards and administrative controls.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(a)[2]	Work shall be performed under controlled conditions using approved instructions, procedures, or other appropriate means.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(a)[3]	Items shall be identified and controlled to ensure their proper use.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(a)[4]	Items shall be maintained to prevent their damage, loss, or deterioration.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(a)[5]	Equipment used for processing monitoring or data collection shall be calibrated and maintained.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2

Criteria	DOE Order 5700.6C, "Quality Assurance"	Mandatory
9.b.(2)(b)[1]	Items and processes shall be designed using sound engineering/scientific principles and appropriate standards.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(b)[2]	Design work, including changes, shall incorporate applicable requirements and design bases.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(b)[3]	Design interfaces shall be identified and controlled.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(b)[4]	The adequacy of design products shall be verified or validated by individuals or groups other than those who shall be completed before approval and implementation of the design.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(b)[5]	Verification and validation work shall be completed before approval and implementation of the design.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(c)[1]	The organization shall ensure that procured items and services meet established requirements and perform as specified.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(c)[2]	Prospective suppliers shall be evaluated and selected on the basis of specified criteria.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(c)[3]	The organization shall ensure that approved suppliers can continue to provide acceptable items and services.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(d)[1]	Inspection and acceptance testing of specified items and processes shall be conducted using established acceptance and performance criteria.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(2)(d)[2]	Equipment used for inspections and tests shall be calibrated and maintained.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(3)(a)[1]	Management at all levels shall periodically assess the integrated quality assurance program and its performance.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(3)(a)[2]	Problems that hinder the organization from achieving its objectives shall be identified and corrected.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(3)(b)[1]	Planned and periodic independent assessments shall be conducted to measure item quality and process effectiveness and to promote improvement.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(3)(b)[2]	The organization performing independent assessments shall have sufficient authority and freedom from the line organization to carry out its responsibilities.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
9.b.(3)(b)[3]	Persons conducting independent assessments shall be technically qualified and knowledgeable in the areas assessed.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
1.1.[4.1]	It is role of senior management to establish and cultivate principles that integrate quality requirements into daily work.	WHC-CM-1-1, WHC-CM-1-2, WHC-CM-1-3, WHC-CM-4-2

Criteria	DOE Order 5700.6C, "Quality Assurance"	Mandatory
I.1.[4.4]	Senior management is expected to demonstrate commitment and leadership to achieve quality through active involvement in the implementation of an effective quality assurance program.	WHC-CM-1-1, WHC-CM-1-2, WHC-CM-1-3, WHC-CM-4-2
I.1.[4.5]	The individuals' role is to meet the quality requirements while recommending improvements in item and process quality.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
I.1.[5.1]	Achieving quality is the responsibility of people throughout the organization, from the top executives to workers, including designers, scientists, engineers, welders, inspectors, researchers, operators, craftsmen, and auditors.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
I.II.A.1.b.[2]	Line management is responsible for the achievement of quality.	WHC-CM-1-1, WHC-CM-1-2, WHC-CM-1-3, WHC-CM-4-2
I.II.A.1.b.[3]	Each individual is responsible for the quality of his/her work.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
I.II.B.3.g.	Before a procured item is used or placed in service, procurement specification, inspection, and test requirements are to be satisfied and nonconformances properly dispositioned.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
I.II.B.4.a.(2)[2]	Personnel may not inspect their own work for acceptance.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
I.II.B.4.b.5	Retesting of items or processes to determine that they meet acceptance criteria is required after deficiencies are corrected.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
I.II.C.1.b.[2]	Direct participation by senior management during management assessments is essential.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2
I.II.C.2.b.[2]	Their responsibilities are to monitor work performance, identify abnormal performance and precursors of potential problems, identify opportunities for improvement, report results to a level of management having the authority to effect corrective actions, and verify satisfactory resolution of problems.	WHC-CM-1-1, WHC-CM-1-3, WHC-CM-4-2

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DOE Order 5820.2A, Radioactive Waste Management

The following Reference(s) have been cited in the attached DOE Order 5820.2A, "Radioactive Waste Management," Compliance Assessment.

WHC-CM-1-1, *Management Policies*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-3, *Management Requirements and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-6, *Radiological Control Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-2-14, *Hazardous Material Packaging and Shipping*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-3-5, *Document Control and Records Management Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-2, *Quality Assurance Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-3, *Industrial Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-9, *Radiological Design*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-11, *ALARA Program Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-29, *Nuclear Criticality Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-46, *Nonreactor Facility Safety Analysis Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-5-16, *Solid Waste Management*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-6-1, *Standard Engineering Practices*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-7-5, *Environmental Compliance Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-EP-0063-3, *Hanford Site Solid Waste Acceptance Criteria*, Westinghouse Hanford Company, Richland, Washington.

WHC-EP-0231, *Hanford Surplus Facilities Program Plan - Fiscal Year 1989*,
Westinghouse Hanford Company, Richland, Washington.

WHC-EP-0496, *Westinghouse Hanford Company Waste Minimization and Pollution
Preventive Awareness Program Plan*, Westinghouse Hanford Company,
Richland, Washington.

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
1.3. a.(1)(a)[1]	Design objectives for new facilities will assure protection of the public and operating personnel from hazards associated with normal high-level waste operations, accident conditions, and the effects of natural phenomena.	WHC-CM-4-9
1.3. a.(1)(b)	Designs for new storage and treatment facilities shall meet the requirements of DOE 6430.1, applicable EH Orders and 40 CFR 264.	WHC-CM-1-3 WHC-CM-1-1
1.3. a.(1)(c)	Designs for new storage facilities shall incorporate features to facilitate retrieval capability.	WHC-CM-7-5
1.3. b.(1)(a)[1]	Liquid and solidified high-level waste shall be characterized consistent with radiation protection requirements to determine its hazardous components, per 40 CFR 261 and 40 CFR 264.	WHC-CM-7-5
1.3. b.(1)(a)[2]	Characterization shall satisfy requirements of paragraph 3b(1)(b)...	N/A
1.3. b.(1)(a)[3]	...and may reflect knowledge of waste generating processes, laboratory testing results, and/or the results of periodic sampling and analysis.	
1.3. b.(1)(b)	Waste characteristics and compatibility information shall be documented in a safety analysis report...and be used as a basis for designing new facilities.	N/A
1.3. b.(2)(a)	All new high-level waste handling, transfer, and storage facilities shall be doubly contained.	WHC-CM-7-5
1.3. b.(2)(b)[1]	Singly contained pipelines may be used routinely for liquid waste that has a total radioactivity concentration of less than 0.05 Ci/gal (4.9×10^{11} Bq/m ³).	
1.3. b.(2)(b)[2]	They may be used on a temporary basis for higher activity waste, if appropriate design and administrative controls are in place to mitigate adverse effects from a pipeline failure.	
1.3. b.(2)(c)	Leaking waste storage systems shall not be used to receive waste unless secondary containment is maintained...and it can be shown with the support of formal documentation...that temporary operation can be performed without releasing radioactive liquid to the environment.	WHC-CM-7-5
1.3. b.(2)(d)[1]	Secondary containment systems shall be capable of containing liquids that leak into them from the primary system and shall be equipped with transfer capability to retrieve the leaked liquid.	WHC-CM-7-5
1.3. b.(2)(d)[2]	Secondary containment systems for solidified high-level waste shall provide for physical isolation of the waste from the environment.	N/A
1.3. b.(2)(e)	To the extent practical, waste shall be segregated by type (sludge, salt, high activity, and low activity) to make accessibility for future processing easier.	WHC-CM-7-5
1.3. b.(2)(f)[1]	Where required, ventilation and filtration systems shall be provided to maintain radionuclide releases within the guidelines specified in DOE 5481.1B and applicable EH Orders.	WHC-CM-7-5
1.3. b.(2)(f)[2]	Ventilation systems shall be provided where the possibility exists for generating flammable and explosive mixtures of gases.	WHC-CM-4-9
1.3. b.(2)(g)[1]	Facilities using cathodic corrosion protection systems shall include engineered features that protect against abnormal conditions such as stray currents or system failure.	N/A

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
1.3. b.(2)(g)(2)	The cathodic protection systems shall be calibrated annually, and all sources of impressed current shall be inspected and/or tested at least every other month.	WHC-CM-7-5
1.3. b.(2)(h)(1)	Engineering controls shall be incorporated to provide liquid volume inventory data and to prevent spills, leaks, and overflows from tanks or containment systems.	WHC-CM-7-5
1.3. b.(2)(h)(2)	The high-level waste shall be stored at pressures lower than those of ancillary systems.	N/A
1.3. b.(2)(i)	Nuclear criticality safety considerations and controls shall be evaluated for normal operations and, before any significant operational changes are made, to protect against an uncontrolled nuclear criticality incident.	WHC-CM-4-29
1.3. b.(2)(k)	Upon loss and subsequent recovery of normal electrical power, high-level waste transfer equipment shall not have the capability to restart without active operator action.	N/A
1.3. b.(3)(a)(1)	Monitoring and leak detection capability shall be incorporated in the engineering systems to provide rapid identification of failed containment, and measurement of abnormal temperatures.	WHC-CM-4-9
1.3.b.(3)(a)(2)	The following, at a minimum, shall be monitored: temperature; pressure; radioactivity in ventilation exhaust; and liquid effluent streams associated with high-level waste facilities.	N/A
1.3. b.(3)(a)(3)	Where the possibility exists for the generation of flammable and explosive mixtures of gases, monitoring shall be conducted.	N/A
1.3. b.(3)(b)	Leak detection systems shall be designed and operated so that they will detect the failure of the primary containment boundary, the occurrence of waste release, or accumulated liquid in the secondary containment system.	WHC-CM-4-9
1.3. b.(3)(c)	A method for periodically assessing waste storage system integrity shall be established, documented, and reported as required in the Waste Management Plan.	WHC-CM-7-5
1.3. b.(3)(d)	Electrical monitoring and leak detection devices essential to safe operations shall be provided with backup power, as appropriate, to ensure operability under emergency conditions.	WHC-CM-4-9
1.3. b.(3)(f)	A system of ground water or vadose zone monitoring wells meeting the Resource Conservation and Recovery Act requirements per 40 CFR 264 shall be installed, as a minimum, around clusters of liquid waste storage tanks.	WHC-CM-7-5
1.3. b.(4)(a)	A tank or secondary containment system from which there has been a leak or a spill to the surrounding soil, or which is otherwise unfit for use, shall be removed from service until conditions can be evaluated fully.	WHC-CM-7-5
1.3. b.(4)(b)(1)	Upon detection of released radioactive materials, steps shall be taken to prevent further migration of the release to soil or surface water.	WHC-CM-7-5
1.3. b.(4)(b)(2)	Major contamination in the soil shall be removed or stabilized unless compliance with this requirement would cause greater harm to human health or the environment.	WHC-CM-7-5

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
1.3. b.(4)(d)[1]	For emergency situations involving liquid high-level waste, spare capacity with adequate heat dissipation capability shall be maintained to receive the largest volume of liquid contained in any one tank.	WHC-CM-4-9
1.3. b.(4)(d)[2]	Adequate transfer pipelines also shall be maintained in operational condition.	WHC-CM-7-5
1.3. b.(4)(e)[1]	A schedule and procedure shall be developed for monitoring, surveillance, and calibration checks.	WHC-CM-7-5
1.3. b.(4)(e)[2]	The frequency of these activities shall be based on the potential rate of equipment deterioration and the possibility of an environmental or human health incident, assuming that a malfunction from equipment failure or human error is not detected between checks.	N/A
1.3. b.(4)(e)[3]	Schedules, procedures, and performance requirements shall be documented in the operating and maintenance documentation.	ND
1.3. b.(4)(f)	Each high-level waste facility shall have response procedures for credible emergencies, as identified in the Safety Analysis Reports.	WHC-CM-4-46
1.3. b.(5)(a)	Operator training and qualification standards shall be developed and an up-to-date record of training status shall be maintained.	WHC-CM-1-3
1.3. b.(5)(b)	Worker safety training must comply with the requirements of DOE 5480.1B and applicable EH Orders.	WHC-CM-4-3
1.3. b.(6)	Consistent with DOE Order 5700.6B, high-level waste operations shall be conducted in accordance with applicable requirements of the American National Standards Institute/American Society of Mechanical Engineers Nuclear Quality Assurance-1 and other appropriate national consensus standards.	WHC-CM-1-1 WHC-CM-4-2
1.3. b.(7)(a)	For the purpose of economy and enhancing the safety of high-level waste storage, processing programs shall be developed and implemented at the generating site to reduce the quantity of waste being sent to storage, and techniques shall be implemented to reduce further the waste volume in storage.	WHC-CM-7-5
1.3. b.(7)(b)[2]	This may include separation of high-level waste into other waste categories, such as transuranic waste or low-level waste.	
1.3. b.(7)(c)	The chemistry of liquid high-level waste shall be adjusted to control corrosion within design limits for the storage system.	N/A
1.3. b.(7)(d)	Treatment reagents shall not be placed in a tank system without proven effective mitigative action if they could cause the tank, its ancillary equipment, or the containment system to rupture, leak, or otherwise fail.	WHC-CM-7-5
1.3. b.(7)(e)	Waste generation and waste management systems that significantly change the chemical and physical forms of the waste shall be technically assessed to assure compatibility and retrievability.	WHC-CM-7-5
1.3. c.(1)[1]	The contents of singly contained tank systems shall be characterized consistent with radiation protection requirements and the needs associated with safe storage to determine its hazardous components consistent with 40 CFR 261, 40 CFR 264, and State requirements.	WHC-CM-7-5

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
1.3. c.(2)(a)	Singly contained tank systems shall not be used to store fresh high-level waste from fuel reprocessing operations except under emergency conditions as determined by the Operations Office Manager.	WHC-CM-4-9
1.3. c.(2)(b)	Storage and transfer operations shall be conducted within the limits defined in the Safety Analysis Reports according to DOE 5481.1B.	WHC-CM-4-46
1.3. c.(2)(c)	Engineered systems shall be incorporated to provide waste volume inventory data, consistent with the nature of the specific waste stored in singly contained tanks.	WHC-CM-7-5
1.3. c.(2)(e)	Where active ventilation is required, systems shall be provided to maintain radionuclide releases at the point of discharge within the guidelines specified in applicable EH Orders for offsite concentrations and DOE 5480.1B for onsite dose commitment considerations.	WHC-CM-7-5
1.3. c.(2)(g)	Each facility shall use remote maintenance features and other appropriate techniques to maintain personnel radiation exposure as low as reasonably achievable.	WHC-CM-4-11 WHC-CM-4-9
1.3. c.(3)(a)	Monitoring and surveillance capability shall exist to provide liquid volume, waste inventory data, and identification of failed containment.	WHC-CM-7-5
1.3. c.(3)(b)	A method for periodically assessing waste storage tank integrity shall be established and documented.	WHC-CM-7-5
1.3. c.(4)(a)	A contingency action plan shall be maintained to respond to spills or leaks and other credible emergencies as identified in the Safety Analysis Reports.	WHC-CM-7-5
1.3. c.(4)(c)	For emergency situations involving pumpable liquid in singly contained tanks, appropriate equipment shall be maintained to provide removal of liquid.	N/A
1.3. d. [1]	New and readily retrievable waste shall be processed and the high-level waste fraction disposed of in a geologic repository according to the requirements of the Nuclear Waste Policy Act of 1982 (Public Law 97-425) as amended.	WHC-CM-7-5
1.3. d. [2]	Options for permanent disposal of other waste, such as single shell tank waste, shall be evaluated and include such methods as in-place stabilization as well as retrieval and processing, as required for new and readily retrievable waste.	WHC-CM-7-5
1.3. d. [3]	Analytic predictions of disposal system performance shall be prepared and incorporated in the National Environmental Policy Act process.	N/A
1.3. d.(1)	New and readily retrievable existing high-level waste shall be processed to a final immobilized form in facilities such as the Defense Waste Processing Facility and the Hanford Waste Vitrification Plant preparatory to permanent disposal in a deep geologic repository.	WHC-CM-7-5
1.3. d.(1)(a)[1]	Waste acceptance specifications and criteria based upon the requirements outlined in 10 CFR 60.113, 10 CFR 60.131(b)(7), 10 CFR 60.135, 10 CFR 71.87, and 40 CFR 191 shall be developed for high-level waste forms prior to startup of facilities that generate the disposal waste form.	N/A
1.3. d.(2)[1]	High-level waste that is not readily retrievable shall be monitored periodically in situ.	N/A

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
1.3. d.(2)(3)	Options for permanent disposal of singly contained tank waste shall be evaluated and include such methods as in-place stabilization as well as retrieval and processing, as required for new and readily retrievable waste in paragraph 3d(1).	N/A
11.3.a.(1)	Any material that is known to be, or suspected of being contaminated with transuranium radionuclides shall be evaluated as soon as possible in the generating process, and determined to be either recoverable material, transuranic waste, low-level waste, mixed waste, or non-radioactive trash in order to avoid commingling the various material streams.	WHC-EP-0063-3
11.3.a.(2)(1)	The lower concentration limit for transuranic waste (>100 nCi/g of waste) shall apply to the contents of any single waste package at the time of assay.	WHC-EP-0063-3
11.3.a.(2)(2)	The mass of the waste container including shielding shall not be used in calculating the specific activity of the waste.	WHC-EP-0063-3
11.3.a.(3)	Radioactive wastes with quantities of transuranic radionuclides in concentrations of 100 nCi/g of waste or less shall be considered to be low-level waste, and shall be managed according to the requirements of Chapter III of this Order.	WHC-EP-0063-3
11.3.a.(4)(a)	Mixed transuranic waste meeting the requirements of the Waste Isolation Pilot Plant-Waste Acceptance Criteria shall be sent to the Waste Isolation Pilot Plant.	WHC-EP-0063-3
11.3.a.(4)(b)	The Data Package prepared by the generators for the Waste Isolation Pilot Plant shall include information on the kinds and quantities of hazardous components contained in a waste package in accordance with applicable Resource Conservation and Recovery Act regulations.	WHC-EP-0063-3
11.3.a.(4)(c)	The determination whether the transuranic waste exhibits any hazardous characteristics or contains listed hazardous components may be based on knowledge of the waste generating process when the performance of a chemical analysis would significantly increase the radiation hazard to personnel.	
11.3.b.(1)(1)	Technical and administrative controls shall be directed to reducing the gross volume of waste generated and/or the amount of radioactivity requiring disposal.	WHC-CM-1-1 WHC-CM-1-3 WHC-EP-0063-3
11.3.b.(1)(2)	Transuranic waste reduction efforts shall be based on the implementation of techniques such as process modification, process optimization, materials substitution, decontamination, assay of suspect waste, and new technology development.	WHC-EP-0063-3
11.3.b.(1)(3)	Volume reduction techniques, such as incineration, compaction, extraction, and shredding, shall be implemented wherever cost effective and practical.	WHC-EP-0063-3
11.3.b.(1)(4)	Treatment facilities shall be permitted by the appropriate regulatory authority.	WHC-CM-7-5
11.3.b.(2)(1)	Transuranic waste shall be assayed or otherwise evaluated to determine the kinds and quantities of transuranic radionuclides present prior to storage.	WHC-EP-0063-3
11.3.b.(2)(2)	Additionally, hazardous waste components shall be estimated or analyzed, whichever is appropriate.	WHC-EP-0063-3

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
11.3.b.(3)	Mixed transuranic waste shall be treated, where feasible and practical, to destroy the hazardous waste component.	WHC-EP-0063-3
11.3.b.(4)[1]	Transuranic waste that is classified for security reasons shall be treated to remove or destroy the classified characteristic(s) prior to certification.	WHC-EP-0063-3
11.3.c.(1)	Transuranic waste shall be certified, pursuant to the Waste Isolation Pilot Plant-Waste Acceptance Criteria, placed in interim storage, and sent to the Waste Isolation Pilot Plant when it becomes operational.	WHC-EP-0063-3
11.3.c.(2)	Uncertified transuranic waste shall not be sent to the Waste Isolation Pilot Plant except by special permission granted in response to a formal, documented request to the Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee and the Waste Isolation Pilot Plant Waste Operations.	N/A
11.3.c.(3)	All transuranic waste certification sites shall prepare a certification plan which describes how the waste meets each waste acceptance criterion described in the WIPP-DOE-069 (see Attachment 1, page 3, paragraph 18).	WHC-EP-0063-3
11.3.c.(4)[1]	Each certification plan shall define controls and other measures to ensure that each element of the certification plan is performed adequately as described.	N/A
11.3.c.(4)[2]	Requirements for these quality assurance activities are described in the WIPP-DOE-120 (see Attachment 1, page 2, paragraph 19).	N/A
11.3.c.(5)	Certification plans, including associated quality assurance plans, shall be submitted for review, comment, and approval by the Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee.	N/A
11.3.c.(7)	The Environmental Evaluation Group's comments on certification and associated quality assurance plans shall be resolved between the affected site and the Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee prior to granting formal approval of the plans.	N/A
11.3.c.(8)	Approved certification and associated quality assurance plans shall be implemented by the generating sites using specific, written operational procedures.	N/A
11.3.d.(1)	Newly generated transuranic waste shall be placed in noncombustible packaging that meets DOT requirements.	WHC-EP-0063-3
11.3.d.(2)	All type A transuranic waste containers shall be equipped with a method to prevent pressure buildup.	WHC-EP-0063-3
11.3.d.(3)	The waste packages shall be marked, labeled, and sealed in accordance with the Waste Isolation Pilot Plant-Waste Acceptance Criteria, EPA, and DOT requirements, as defined in the WIPP-DOE-069, 40 CFR 262, Subpart C, and 49 CFR 172, Subparts D, E, and 49 CFR 173, Subpart I, where applicable, prior to shipping.	WHC-EP-0063-3

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
11.3.e.	The following activities shall be performed to assure the safe storage of transuranic wastes consistent with the requirements of applicable Resource Conservation and Recovery Act regulations;	WHC-CM-1-1
11.3.e.(1)	Transuranic waste shall be segregated or otherwise clearly identified to avoid the commingling of transuranic waste streams with high-level waste or low-level waste.	WHC-EP-0063-3
11.3.e.(2)	Certified transuranic waste shall not be commingled with noncertified transuranic waste and shall be stored in a manner unlikely to alter its certification status.	WHC-EP-0063-3
11.3.e.(3)	Transuranic waste in storage areas shall be protected from unauthorized access.	WHC-CM-5-16
11.3.e.(4)	Transuranic wastes in storage shall be monitored periodically to ensure that the wastes are not releasing their radioactive and/or hazardous constituents.	WHC-CM-7-5
11.3.e.(5)	Transuranic waste storage facilities shall be designed, constructed, maintained, and operated to minimize the possibility of fire, explosion, or accidental release of radioactive and/or hazardous components of the waste to the environment.	WHC-CM-5-16
11.3.e.(6)	Facilities which store transuranic waste shall have a contingency plan designed to minimize the adverse impacts of fire, explosion, or accidental release of hazardous components of the waste to the environment.	N/A
11.3.e.(7)	Transuranic waste shall be stored in such a way so as to maintain radiation exposures as low as reasonably achievable.	WHC-CM-7-5
11.3.f.(1)	Transuranic waste shipments shall comply with the provisions of DOE and DOT regulations, pursuant to DOE 1540.1.	WHC-CM-2-14
11.3.g.(2)	New interim storage facilities shall be sited, designed, constructed, and operated consistent with the requirements of applicable Resource Conservation and Recovery Act Regulations and in a manner which satisfactorily addresses the following considerations at a minimum:	WHC-CM-5-16
11.3.g.(2)(a)	Proximity to ground water and areas of seismic activity or flood plains shall be identified, and potential impacts shall be evaluated.	WHC-CM-5-16
11.3.g.(2)(b)[1]	The facility shall be designed and operated to minimize the run on and run off of precipitation.	WHC-CM-5-16
11.3.g.(2)(b)[2]	The run off control system shall provide for collecting and sampling run off, which may come in contact with the waste packages, prior to releasing the water for discharge.	WHC-CM-5-16
11.3.g.(2)(c)[1]	An environmental monitoring system shall be provided to detect any release and migration of major radioactive and hazardous components.	WHC-CM-7-5
11.3.g.(2)(c)[2]	Background levels of primary radioactive and hazardous waste components shall be determined.	N/A
11.3.g.(2)(d)	The storage facility design shall minimize the possibility for the unauthorized entry of persons.	WHC-CM-7-5

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
11.3.g.(2)(e)	Incompatible wastes types shall be placed in separate packages and stored in segregated areas to prevent accidental ignition or chemical reaction.	WHC-EP-0063-3
11.3.g.(2)(f)	Waste storage facilities shall be designed and operated to minimize the exposure of personnel to radiation and chemicals.	WHC-CM-1-3
11.3.g.(2)(g)	The storage facility operator shall inspect or verify routinely the condition of waste packages at the storage site of deterioration that may threaten human health or cause release of hazardous radioactive components to the environment.	WHC-CM-7-5
11.3.g.(2)(h)[1]	The storage facility operator shall prepare plans that identify and describe how the site will be closed at the end of its active life.	WHC-CM-7-5
11.3.g.(2)(h)[2]	These plans shall address sampling, testing, and monitoring for major radioactive and hazardous waste components in soil and groundwater.	N/A
11.3.g.(2)(i)	Sites that use underground storage tanks for the storage of transuranic waste shall comply with the requirements of the Resource Conservation and Recovery Act, as applicable.	N/A
11.3.g.(2)(j)	Permits shall be acquired, as necessary, from appropriate regulatory entities for all the interim storage facility activities listed above.	N/A
11.3.g.(3)[1]	Existing interim storage sites shall be reviewed for consistency with the items in paragraph 3g(2).	N/A
11.3.g.(3)[2]	Any necessary corrective actions shall be performed based on a compliance schedule approved by appropriate regulatory authorities.	N/A
11.3.g.(4)	Certified waste shall be stored in a manner unlikely to alter the certification of the waste package.	WHC-CM-5-16
11.3.i.(2)[1]	Each waste site shall be characterized to include information on types and quantities of radioactive and hazardous chemicals.	WHC-CM-5-16
11.3.i.(2)[2]	This information shall be verified by appropriate sampling/analysis/monitoring techniques.	WHC-CM-5-16
11.3.i.(2)[3]	The characterization and verification activities will also include determination of waste migration from the burial sites and potential environmental and health impacts.	WHC-CM-5-16
11.3.i.(3)	Each DOE site will develop a closure strategy for the waste site(s), utilizing the waste characterization data.	WHC-CM-5-16
11.3.i.(3)(a)	Basic site-closure strategies which could be a combination of (a), (b), and (c) depending on site-specific and regulatory requirements, are as follows: Leave waste in place with enhanced monitoring.	WHC-CM-5-16
11.3.i.(3)(b)	Basic site-closure strategies which could be a combination of (a), (b), and (c) depending on site-specific and regulatory requirements, are as follows: Leave waste in place, use enhanced confinement or in-situ immobilization techniques, and provide enhanced monitoring.	WHC-CM-5-16

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
II.3.i.(3)(c)	Basic site-closure strategies which could be a combination of (a), (b), and (c) depending on site-specific and regulatory requirements, are as follows: Retrieve, process, and dispose of the transuranic waste at the Waste Isolation Pilot Plant.	WHC-CM-5-16
II.3.i.(4)(a)	Each DOE site will develop a site closure plan, which will include, as a minimum, the following: National Environmental Policy Act requirements.	WHC-CM-5-16
II.3.i.(4)(b)	Each DOE site will develop a site closure plan, which will include, as a minimum, the following: Applicable Federal, State and local regulations.	WHC-CM-5-16
II.3.i.(4)(c)	Each DOE site will develop a site closure plan, which will include, as a minimum, the following: Permits required;	WHC-CM-5-16
II.3.i.(4)(d)	Each DOE site will develop a site closure plan, which will include, as a minimum, the following: Selected closure strategy and justification;	WHC-CM-5-16
II.3.i.(4)(e)1	Each DOE site will develop a site closure plan, which will include, as a minimum, the following: A waste retrieval strategy: Methodology for segregating transuranic and low-level waste,	WHC-CM-5-16
II.3.i.(4)(e)2	Each DOE site will develop a site closure plan, which will include, as a minimum, the following: A waste retrieval strategy: Identification of mixed waste components,	WHC-CM-5-16
II.3.i.(4)(e)3	Each DOE site will develop a site closure plan, which will include, as a minimum, the following: A waste retrieval strategy: Certification of transuranic waste for disposal at the Waste Isolation Pilot Plant,	WHC-CM-5-16
II.3.i.(4)(e)4	Each DOE site will develop a site closure plan, which will include, as a minimum, the following: A waste retrieval strategy: Management of low-level waste and mixed waste, and	WHC-CM-5-16
II.3.i.(4)(e)5	Each DOE site will develop a site closure plan, which will include, as a minimum, the following: A waste retrieval strategy: Plans for maintaining exposures as low as reasonably achievable;	WHC-CM-5-16
II.3.i.(4)(f)	Each DOE site will develop a site closure plan, which will include, as a minimum, the following: Budget requirements by fiscal year;	WHC-CM-5-16
II.3.i.(4)(g)	Each DOE site will develop a site closure plan, which will include, as a minimum, the following: Schedule for closure strategy completion;	WHC-CM-5-16
II.3.i.(4)(h)	Each DOE site will develop a site closure plan, which will include, as a minimum, the following: Post-closure monitoring and controls.	WHC-CM-5-16
III.3.a.(1)	DOE-low-level waste that has not been disposed of prior to issuance of this Order shall be managed on the schedule developed in the Implementation Plan (see page 7, paragraph 10) to accomplish the following: Protect public health and safety in accordance with standards specified in applicable EH Orders and other DOE Orders.	WHC-CM-7-5

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
III.3.a.(2)[1]	DOE-low-level waste that has not been disposed of prior to issuance of this Order shall be managed on the schedule developed in the Implementation Plan (See page 7, paragraph 10) to accomplish the following: Assure that external exposure to the waste and concentrations of radioactive material which may be released into surface water, groundwater, soil, plants and animals results in an effective dose equivalent that does not exceed 25 mrem/yr to any member of the public.	WHC-CM-7-5
III.3.a.(2)[2]	Releases to the atmosphere shall meet the requirements of 40 CFR 61.	WHC-CM-7-5
III.3.a.(4)	Protect ground water resources, consistent with Federal, State and local requirements.	
III.3.c.(1)[1]	Technical and administrative controls shall be directed to reducing the gross volume of waste generated and/or the amount of radioactivity requiring disposal.	WHC-EP-0063-3
III.3.c.(1)[2]	Waste reduction efforts shall include consideration of process modification, process optimization, materials substitution and decontamination.	WHC-EP-0063-3
III.3.c.(2)	All DOE-low-level waste generators shall establish auditable programs (goals, incentives, procedures, and reports) to assure that the amount of low-level waste generated and/or shipped for disposal is minimized.	WHC-EP-0063-3
III.3.c.(3)	Each DOE-low-level waste generator shall separate uncontaminated waste from low-level waste to facilitate cost effective treatment and disposal.	WHC-EP-0063-3
III.3.c.(4)	Each DOE-low-level waste generator preparing a design for a new process or process change shall incorporate principles into the design that will minimize the generation of low-level waste.	WHC-EP-0063-3
III.3.d.(1)[1]	Low-level waste shall be characterized with sufficient accuracy to permit proper segregation, treatment, storage, and disposal.	WHC-EP-0063-3
III.3.d.(1)[2]	This characterization shall ensure that, upon generation and after processing, the actual physical and chemical characteristics and major radionuclide content are recorded and known during all stages of the waste management process.	WHC-EP-0063-3
III.3.d.(2)(a)	Waste characterization data shall be recorded on a waste manifest, as required by paragraph 3m, and shall include: The physical and chemical characteristics of the waste.	WHC-EP-0063-3
III.3.d.(2)(b)	Waste characterization data shall be recorded on a waste manifest, as required by paragraph 3m, and shall include: Volume of the waste (total of waste and any solidification or absorbent media).	WHC-EP-0063-3
III.3.d.(2)(c)	Waste characterization data shall be recorded on a waste manifest, as required by paragraph 3m, and shall include: Weight of the waste (total of waste and any solidification or absorbent media).	WHC-EP-0063-3
III.3.d.(2)(d)	Waste characterization data shall be recorded on a waste manifest, as required by paragraph 3m, and shall include: Major radionuclides and their concentrations.	WHC-EP-0063-3

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
III.3.d.(2)(e)	Waste characterization data shall be recorded on a waste manifest, as required by paragraph 3m, and shall include: Packaging date, package weight, and external volume.	WHC-EP-0063-3
III.3.e.(1)	Waste shipped from one field organization to another for treatment, storage or disposal shall be done in accordance with the requirements established by the operations office having responsibility for operations of the receiving facility.	WHC-CM-2-14
III.3.e.(2)	Waste acceptance criteria shall be established for each low-level waste treatment, storage, and disposal facility, and submitted to the cognizant field organization.	N/A
III.3.e.(3)(1)	Generators of waste shall implement a low-level waste certification program to provide assurance that the waste acceptance criteria for any low-level treatment, storage, or disposal facility used by the generator are met.	WHC-EP-0063-3
III.3.e.(3)(2)	Generators and facilities receiving the waste are jointly responsible for assuring compliance with waste acceptance criteria.	WHC-EP-0063-3
III.3.e.(3)(3)	Generators are financially responsible for actions required due to nonconformance.	WHC-EP-0063-3
III.3.e.(4)	Generator low-level waste certification programs shall be subject to a periodic audit by operators of facilities to which the waste is sent by the generator.	WHC-EP-0063-3
III.3.e.(5)(a)	The waste acceptance criteria for storage, treatment, or disposal facilities shall address the following issues: Allowable quantities/concentrations of specific radioisotopes to be handled, processed, stored or disposed of;	WHC-EP-0063-3
III.3.e.(5)(b)	The waste acceptance criteria for storage, treatment, or disposal facilities shall address the following issues: Criticality safety requirements (waste forms and geometries);	WHC-EP-0063-3
III.3.e.(5)(c)	The waste acceptance criteria for storage, treatment, or disposal facilities shall address the following issues: Restrictions regarding low-level waste classified for security reasons;	WHC-EP-0063-3
III.3.e.(5)(d)	The waste acceptance criteria for storage, treatment, or disposal facilities shall address the following issues: External radiation and internal heat generation;	WHC-EP-0063-3
III.3.e.(5)(e)	The waste acceptance criteria for storage, treatment, or disposal facilities shall address the following issues: Restrictions on the generation of harmful gases, vapors, or liquids in waste;	WHC-EP-0063-3
III.3.e.(5)(f)	The waste acceptance criteria for storage, treatment, or disposal facilities shall address the following issues: Chemical and structural stability of waste packages, radiation effect, microbial activity, chemical reactions, and moisture;	WHC-EP-0063-3
III.3.e.(5)(g)	The waste acceptance criteria for storage, treatment, or disposal facilities shall address the following issues: Restrictions for chelating and complexing agents having the potential for mobilizing radionuclides; and	WHC-EP-0063-3
III.3.e.(5)(h)	The waste acceptance criteria for storage, treatment, or disposal facilities shall address the following issues: Quantity of free liquids.	WHC-EP-0063-3

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
III.3.f.(1)	Waste shall be treated by appropriate methods so that the disposal site can meet the performance objectives stated in paragraph 3a.	WHC-CM-7-5
III.3.f.(2)[1]	Waste treatment techniques such as incineration, shredding, and compaction to reduce volume and provide more stable waste forms shall be implemented as necessary to meet performance requirements.	WHC-EP-0063-3
III.3.f.(2)[2]	Use of waste treatment techniques to increase the life of the disposal facility and improve long-term facility performance, by improved site stability and reduction of infiltrating water, is required to the extent it is cost effective.	WHC-EP-0063-3
III.3.f.(3)(a)	The development of large scale waste treatment facilities shall be supported by appropriate the National Environmental Policy Act documentation in addition to the following: A document shall be prepared that analyzes waste streams needing treatment, treatment options considered and a rationale for selection of proposed treatment processes;	WHC-CM-7-5
III.3.f.(3)(b)	The development of large scale waste treatment facilities shall be supported by appropriate the National Environmental Policy Act documentation in addition to the following: A construction design report including projected waste throughputs and treatment methods, construction and operating cost estimates;	WHC-CM-7-5
III.3.f.(3)(c)	The development of large scale waste treatment facilities shall be supported by appropriate the National Environmental Policy Act documentation in addition to the following: A Safety Analysis Report.	N/A
III.3.f.(4)(a)	Operation of waste treatment facilities shall be supported by adequate documentation including the following: Operation and maintenance procedures;	WHC-CM-5-16
III.3.f.(4)(b)	Operation of waste treatment facilities shall be supported by adequate documentation including the following: Personnel training and qualification procedures;	N/A
III.3.f.(4)(c)	Operation of waste treatment facilities shall be supported by adequate documentation including the following: Monitoring and emergency response plans;	N/A
III.3.f.(4)(d)	Operation of waste treatment facilities shall be supported by adequate documentation including the following: Records shall be maintained for each package of low-level waste that enters and leaves the treatment facility.	WHC-EP-0063-3
III.3.g.(1)[1]	The volume of waste and number of shipments of low-level waste shall be minimized and the shipments will be conducted based on plans developed by field organizations.	WHC-EP-0496
III.3.g.(2)	Generators shall provide an annual forecast in the third quarter of the fiscal year to the field organizations managing the off-site disposal facility to which the waste is to be shipped.	WHC-EP-0063-3
III.3.g.(3)[1]	Generators must receive advance approval from the receiving facility and shall certify prior to shipment that waste meets the receiving facility waste acceptance criteria.	WHC-EP-0063-3
III.3.g.(3)[2]	The certification program shall be auditable and able to withstand independent review.	WHC-EP-0063-3

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
III.3.g.(4)	Each package of waste must comply with the labeling requirements of DOE 1540.1.	WHC-EP-0063-3
III.3.h.(1)	Low-level waste shall be stored by appropriate methods, to achieve the performance objectives stated in paragraph 3a.	WHC-CM-5-16
III.3.h.(2)	Records shall be maintained for all low-level waste that enters and leaves the storage facility, (see paragraph 3m).	WHC-EP-0063-3
III.3.h.(3)	The development and operation of a waste storage facility shall be supported by the following documentation...	WHC-CM-7-5
III.3.h.(3)(a)	The development and operation of a waste facility shall be supported by the following documentation: An analysis which identifies the need for the storage facility;	WHC-CM-7-5
III.3.h.(3)(b)	The development and operation of a waste storage facility shall be supported by the following documentation: A Construction Design Report, including projected waste planned for storage; construction and operating cost estimates;	WHC-CM-7-5
III.3.h.(3)(c)	The development and operation of a waste storage facility shall be supported by the following documentation: A Safety Analysis Report and appropriate National Environmental Policy Act documentation;	N/A
III.3.h.(3)(d)	The development and operation of a waste storage facility shall be supported by the following documentation: Operational procedures and plans.	WHC-CM-5-16
III.3.h.(4)	Storage of waste to allow for nuclides to decay or storage of wastes until they can be disposed of by approved methods are acceptable.	
III.3.i.(1)	Low-level waste shall be disposed of by methods appropriate to achieve the performance objectives stated in paragraph 3a, consistent with the disposal site radiological performance assessment in paragraph 3b.	WHC-CM-7-5
III.3.i.(2)[1]	Engineered modifications (stabilization, packaging, burial depth, barriers) for specific waste types and for specific waste compositions (fission products, induced radioactivity, uranium, thorium, radium) for each disposal site shall be developed through the performance assessment model...	WHC-CM-7-5
III.3.i.(3)[1]	An Oversight and Peer Review Panel of DOE, contractor, and other specialist in performance assessments will be selected by DP-12, with participation by EH-1 and operations office representatives.	
III.3.i.(3)[2]	Through consultation and review, this panel shall ensure consistency and technical quality around the DOE complex in the development and application of performance assessment models that include site specific geohydrology and waste composition.	
III.3.i.(4)[1]	Disposition of waste designated as greater- than-class C, as defined in 10 CFR 61.55, must be handled as special cases.	WHC-CM-5-16

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
III.3.i.(4)(2)	Disposal systems for such waste must be justified by a specific performance assessment through the National Environmental Policy Act process and with the concurrence of DP-12 for all DP-1 disposal facilities and of NE-20 for those disposal facilities under the cognizance of NE-1.	WHC-EP-0063-3
III.3.i.(5)(a)(1)	Waste must not be packaged for disposal in cardboard or brief board boxes, unless such boxes meet DOT requirements and contain stabilized waste with a minimum of void space.	WHC-EP-0063-3
III.3.i.(5)(a)(2)	For all types of containers, void spaces within the waste and between the waste and its packaging shall be reduced as much as practical.	WHC-EP-0063-3
III.3.i.(5)(b)	Liquid wastes, or wastes containing free liquid, must be converted into a form that contains as little freestanding and noncorrosive liquid as is reasonably achievable, but, in no case, shall the liquid exceed 1 percent of the volume of the waste when the waste is in a disposal container, or 0.5 percent of the volume of the waste processed to a stable form.	WHC-EP-0063-3
III.3.i.(5)(c)	Waste must not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water.	WHC-EP-0063-3
III.3.i.(5)(d)	Waste must not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste.	WHC-EP-0063-3
III.3.i.(5)(e)	Waste in a gaseous form must be packaged at a pressure that does not exceed 1.5 atmospheres at 20 degrees Centigrade.	WHC-EP-0063-3
III.3.i.(5)(f)(1)	Waste must not be pyrophoric.	WHC-EP-0063-3
III.3.i.(5)(f)(2)	Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable.	WHC-EP-0063-3
III.3.i.(6)	Waste containing amounts of radionuclides below regulatory concern, as defined by Federal regulations, may be disposed without regard to radioactivity content.	
III.3.i.(7)(a)	Disposal site selection criteria (based on planned waste confinement technology) shall be developed for establishing new low-level waste disposal sites.	WHC-CM-5-16
III.3.i.(7)(b)	Disposal site selection shall be based on an evaluation of the prospective site in conjunction with planned waste confinement technology, and in accordance with the National Environmental Policy Act process.	WHC-CM-5-16
III.3.i.(7)(c)	The disposal site shall have hydrogeologic characteristics which, in conjunction with the planned waste confinement technology, will protect the groundwater resource.	WHC-CM-5-16
III.3.i.(7)(d)	The potential for natural hazards such as floods, erosion, tornadoes, earthquakes, and volcanoes shall be considered in site selection.	WHC-CM-5-16
III.3.i.(7)(e)	Site selection criteria shall address the impact on current and projected populations, land use resource development plans and nearby public facilities, accessibility to transportation routes and utilities, and the location of waste generation.	WHC-CM-5-16

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
III.3.i.(8)(a)[1]	Design criteria shall be established prior to selection of new disposal facilities, new disposal sites, or both.	WHC-CM-4-9
III.3.i.(8)(a)[2]	These design criteria shall be based on analyses of physiographic, environmental, and hydrogeological data to assure that the policy and requirements of this Order can be met.	WHC-CM-5-16
III.3.i.(8)(a)[3]	The criteria shall be also based on assessments of projected waste volumes, waste characteristics, and facility and disposal site performance.	WHC-CM-5-16
III.3.i.(8)(b)	Disposal units shall be designed consistent with disposal site hydrology, geology, and waste characteristics and in accordance with the National Environmental Policy Act process.	WHC-CM-4-9 WHC-CM-5-16
III.3.i.(9)(a)	Field organizations shall develop and implement operating procedures for low-level waste disposal facilities that protect the environment, health and safety of the public, and facility personnel; ensure the security of the facility; minimize the need for long-term control; and meet the requirements of the closure/ post closure plan.	WHC-CM-5-16
III.3.i.(9)(b)	Permanent identification markers for disposal excavations and monitoring wells shall be emplaced.	WHC-CM-4-9
III.3.i.(9)(c)	Operating procedures shall include training for disposal facility operating personnel, emergency response plans, and a system of reporting unusual occurrences according to DOE 5000.3.	N/A
III.3.i.(9)(e)	Operations are to be conducted so that active waste disposal operation will not have an adverse effect on filled disposal units.	N/A
III.3.j.(2)	During closure and post closure, residual radioactivity levels for surface soils shall comply with existing DOE decommissioning guidelines.	N/A
III.3.j.(3)	Corrective measures shall be applied to new disposal sites or individual disposal units if conditions occur or are forecasted that could jeopardize attainment of the performance objectives of this Order.	N/A
III.3.j.(4)[1]	Inactive disposal facilities, disposal sites, and disposal units shall be managed in conformance with the Resource Conservation and Recovery Act, the Comprehensive Environmental Response, Compensation, and Liability Act, and the Superfund Amendments and Reauthorization Act, or...	N/A
III.3.j.(4)[2]	...if mixed waste is involved, may be included in permit applications for operation of contiguous disposal facilities.	
III.3.j.(5)	Closure plans for new and existing operating low-level waste disposal facilities shall be reviewed and approved by the appropriate field organization.	N/A
III.3.j.(6)	Termination of monitoring and maintenance activity at closed facilities or sites shall be based on an analysis of site performance at the end of the institutional control period.	N/A
III.3.k.(1)	Each operational or non-operational low-level waste treatment, storage, and disposal facility shall be monitored by an environmental monitoring program that conforms with DOE 5484.1 and, at a minimum, meet the requirements of paragraph 3K(2) through 3K(4).	WHC-CM-7-5

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
III.3.k.(2)	The environmental monitoring program shall be designed to measure: (a) operational effluent releases; (b) migration of radionuclides; (c) disposal unit subsidence; and (d) changes in disposal facility and disposal site parameters which may affect long-term site performance.	WHC-CM-7-5
III.3.k.(3)	Based on the characteristics of the facility being monitored, the environmental monitoring program may include, but not necessarily be limited to, monitoring surface soil, air, surface water, and, in the subsurface, soil and water, both in the saturated and the unsaturated zones.	
III.3.k.(4)[1]	The monitoring program shall be capable of detecting changing trends in performance sufficiently in advance to allow application of any necessary corrective action prior to exceeding performance objectives.	WHC-CM-7-5
III.3.k.(4)[2]	The monitoring program shall be able to ascertain whether or not effluents from each treatment, storage, or disposal facility or disposal site meet the requirements of applicable EH Orders.	WHC-CM-7-5
III.3.l.	Consistent with DOE 5700.6B, the low-level waste operational and disposal practices shall be conducted in accordance with applicable requirements of American National Standards Institute/American Society of Mechanical Engineers Nuclear Quality Assurance-1 (See Attachment 1, page 5, paragraph 48) and other appropriate national consensus standards.	WHC-CM-4-2
III.3.m.(1)[1]	Each field organization shall develop and maintain a record keeping system that records the following: a historical record of waste generated, treated, stored, shipped, disposed of, or both, at the facilities under its cognizance.	WHC-CM-7-5 WHC-EP-0063-3
III.3.m.(1)[2]	The data maintained shall include all data necessary to show that the waste was properly classified, treated, stored, shipped, and/or disposed of.	WHC-EP-0063-3
III.3.m.(1)[3]	The data maintained in the system shall be based on the data recorded on waste manifests.	WHC-EP-0063-3
III.3.m.(2)[1]	Records shall be kept and accompany each waste package from generator through final disposal.	WHC-EP-0063-3
III.3.m.(2)[2]	The manifest shall contain data necessary to document the proper classification, and assist in determining proper treatment, storage, and disposal of the waste.	WHC-EP-0063-3
III.3.m.(2)[3]	Waste manifest will be kept as permanent records.	WHC-EP-0063-3
III.3.m.(2)[4](a)	At a minimum, the following data will be included: Waste physical and chemical characteristics,	WHC-EP-0063-3
III.3.m.(2)[4](b)	At a minimum, the following data will be included: Quantity of each major radionuclide present,	WHC-EP-0063-3
III.3.m.(2)[4](c)	At a minimum, the following data will be included: Weight of the waste (total of waste and any solidification or absorbent media),	WHC-EP-0063-3
III.3.m.(2)[4](d)	At a minimum, the following data will be included: Volume of the waste (total of waste and any solidification or absorbent media), and	WHC-EP-0063-3
III.3.m.(2)[4](e)	At a minimum, the following data will be included: Other data necessary to demonstrate compliance with waste acceptance criteria.	WHC-EP-0063-3

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
IV.3.a.(1)(i)	Waste covered under this chapter in quantities too large for acceptance at DOE low-level waste disposal sites shall be managed according to the requirements of 40 CFR 192, and disposed of at specially designated DOE sites or tailing disposal sites established under the Uranium Mill Tailings Radiation Control Act of 1978 (Public Law 95-604).	N/A
IV.3.a.(2)	With the approval of the appropriate field organization, small volumes of 11(e) byproduct material and naturally occurring and accelerator produced radioactive waste may be disposed of at DOE low-level waste sites in accordance with the requirements of Chapter III of this Order.	
IV.3.a.(3)(a)	All DOE waste containing: Naturally occurring and accelerator produced radioactive material mixed with the Resource Conservation and Recovery Act hazardous chemicals shall be managed as hazardous waste under the Resource Conservation and Recovery Act.	N/A
IV.3.a.(3)(b)	All DOE waste containing: Byproduct 11(e)(2) (or a combination of 11(e)(2) byproduct and naturally occurring and accelerator produced radioactive material) mixed with the Resource Conservation and Recovery Act hazardous chemicals, shall be managed consistent with both the Resource Conservation and Recovery Act and 40 CFR Part 192.	N/A
IV.3.b.	Consistent with DOE 5700.68, waste management practices shall be conducted in accordance with applicable requirements of American National Standards Institute/ American Society of Mechanical Engineers Nuclear Quality Assurance-1 (reference 4b) and other appropriate national consensus standards.	WHC-CM-4-2
V. 3.	DOE organizations shall develop and document their programs to provide for the surveillance, maintenance, and decommissioning of contaminated facilities.	WHC-CM-7-5
V.3.a.(1)(i)	The decommissioning programs shall be implemented as follows: Each field organization shall prepare and maintain a complete list of contaminated facilities both operational and excess under its jurisdiction.	WHC-CM-1-3
V.3.a.(1)(2)	A continuous record of jurisdictional program responsibility for all contaminated facilities shall be maintained by the cognizant field organization for use in assigning decommissioning responsibility.	WHC-CM-1-3
V.3.a.(2)	The decommissioning programs shall be implemented as follows: Operational records for all contaminated facilities shall be maintained by the cognizant field organization for use in preparing decommissioning plans.	WHC-CM-6-1 WHC-EP-0063-3 WHC-CM-1-3, WHC-CM-3-5
V.3.a.(3)(1)	The decommissioning programs shall be implemented as follows: Planning for facility decommissioning shall be initiated during the design phase for new facilities and prior to termination of operations for existing operational facilities.	WHC-CM-7-5 WHC-CM-1-3
V.3.a.(3)(2)	The decommissioning programs shall be implemented as follows: Such plans shall consider the 2-year budget cycle to assure adequate funding availability.	WHC-CM-1-3

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
V.3.a.(4)[1]	The decommissioning programs shall be implemented as follows: Program offices shall be responsible for placing the facility in a safe storage condition, providing surveillance and maintenance, and decommissioning the facilities under their jurisdiction when they become excess to programmatic needs, or for finding another programmatic sponsor for them.	WHC-CM-1-3 WHC-CM-7-5
V.3.a.(4)[2]	For multiple user facilities, the program office shall determine decommissioning liability for user program offices based on each program's overall contribution to the contamination or some other mutually acceptable basis.	WHC-CM-1-3
V.3.a.(5)[1]	The decommissioning programs shall be implemented as follows: Responsibility for contaminated facilities may be transferred from one program organization to another by mutual agreement of the programs involved.	
V.3.a.(5)[2]	The program organization to which a facility is transferred shall accept full responsibility for surveillance, maintenance, and decommissioning of the facility according to the requirements of this Order.	WHC-CM-1-3
V.3.a.(5)[3]	Agreements to transfer facilities for functional purposes shall be in writing and shall identify explicitly the concurrent transfer of responsibility for surveillance, maintenance, and decommissioning.	WHC-CM-1-3
V.3.d.(1) [1]	Baseline data for each project shall be collected to support a thorough physical, chemical, and radiological characterization to fulfill the requirements of the National Environmental Policy Act reviews, the Resource Conservation and Recovery Act, and the Comprehensive Environmental Response, Compensation, and Liability Act, the Superfund Amendments and Reauthorization Act preliminary assessment/site investigations, and detailed engineering.	
V.3.d.(1)(a)	The baseline data shall include: Drawings, photographs, and other records reflecting the as-built and as modified condition of the facility and grounds;	
V.3.d.(1)(b)	The baseline data shall include: The condition of all structures, existing protective barriers, and systems installed to ensure public, occupational, and environmental safety;	
V.3.d.(1)(c)	The baseline data shall include: The type, form, quantity, and location of hazardous chemical and radioactive material from past operations at the site;and	
V.3.d.(1)(d)	The baseline data shall include: Information on factors that could influence the selection of decommissioning alternatives (safe storage, entombment, dismantlement) such as potential future use, long-range site plans required by DOE 4300.1B, facility condition, and potential health, safety, and environmental hazards.	
V.3.d.(2)[1]	The Comprehensive Environmental Response, Compensation, and Liability Act, the Superfund Amendments and Reauthorization Act and/or the Resource Conservation and Recovery Act status of each project shall be identified and a remedial investigation/feasibility study performed if required.	

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
V.3.d.(2)[2]	Based on the results of the remedial investigation/feasibility study and any additional data deemed necessary by the responsible field organization, an appropriate environmental review shall be performed according to the requirements of the National Environmental Policy Act, the Resource Response, Compensation, and Liability Act, and the Superfund Amendments and Reauthorization Act.	
V.3.d.(2)[3]	Candidate decommissioning alternatives shall be identified, assessed, and evaluated, and a preferred decommissioning alternative selected based on the results of the environmental review.	
V.3.d.(3) [1]	Technical engineering planning for each project shall be conducted during the environmental review process to assure that alternative actions and associated environmental issues are identified and assessed, and to support preparation of environmental documentation.	
V.3.d.(3) [2]	Detailed engineering will be initiated after a preferred alternative is selected.	
V.3.d.(3) [3]	A Decommissioning Project Plan shall be prepared for approval by the appropriate program office in compliance with DOE 4700.1.	
V.3.d.(3)(a)	The Plan shall include the following: Physical, chemical, and radiological characterizational data or references to such data;	
V.3.d.(3)(b)	The Plan shall include the following: A summary evaluation of decommissioning alternatives for the facility including the preferred alternative;	
V.3.d.(3)(c)	The Plan shall include the following: Plans for meeting requirements from the environmental review process (National Environmental Policy Act, the Resource Conservation and Recovery Act, the Comprehensive Environmental Response, Compensation, and Liability Act, and the Superfund Amendments and Reauthorization Act) and all necessary permits;	
V.3.d.(3)(d)	The Plan shall include the following: Radiological criteria to be used (modifications, if any, to guidance presented in applicable EH Orders must be approved by the Headquarters program organization and EH-1);	
V.3.d.(3)(e)	The Plan shall include the following: Projections of occupational exposure;	
V.3.d.(3)(f)	The Plan shall include the following: Estimated quantities of radioactive waste to be generated; and	
V.3.d.(3)(g)	The Plan shall include the following: Detailed administrative, cost, schedule, and management information.	
V.3.d.(4)(a)[1]	The decommissioning project shall be conducted in accordance with guidance from Headquarters program offices and the Decommissioning Project Plan.	WHC-CM-7-5
V.3.d.(4)(b)	Approval of MA-22 (Office of Project and Facilities Management) shall be obtained before initiating activities to demolish a DOE-owned facility, per the requirements of DOE 4300.1B.	WHC-CM-7-5
V.3.d.(4)(c)	Status reports on project activities shall be prepared in accordance with the requirements of DOE 1332.1A or 4700.1, as appropriate.	WHC-EP-0231 WHC-CM-2-5

Criteria	DOE Order 5820.2A, "Radioactive Waste Management"	Mandatory
V.3.d.(4)(d)	Information on waste generation shall be provided to the Integrated Data Base Program, as required.	WHC-CM-7-5
V.3.d.(4)(e)	Decommissioning operations shall be considered a waste generator and shall meet generator requirements contained in the previous chapters of this Order.	WHC-CM-7-5
V.3.d.(5)(a)[1]	After decommissioning operations have been completed, a final radiological and chemical survey report (or an independent verification survey report, at remote sites) and a project final report shall be prepared.	WHC-CM-7-5
V.3.d.(5)(a)[2]	The final report shall include a description of the project, the final status of the property, and the lessons learned from the project.	WHC-CM-7-5
VI .2.	Each site that generates, treats, stores, or disposes of DOE radioactive waste, or decommissions contaminated facilities, is responsible for complying with these requirements in terms of how operations are conducted and how these activities are documented.	

DOE Order 6430.1A, General Design Criteria

Although a criteria by criteria assessment of DOE 6430.1A was not performed (see following assessment) design criteria are addressed in WHC-CM-1-3, *Management Requirements and Procedures*.

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Criteria	DOE Order 6430.1A, "General Design Criteria"	Mandatory
	<p>Department of Energy (DOE) Order 6430.1A, <u>General Design Criteria</u>, provides general design criteria for use in the acquisition of the Department's facilities. The Order consists of sixteen chapters specifically referred to as "divisions" (see Table 1). Division 13, "Special Facilities," is of particular importance in that it presents design requirements for nuclear facilities (see Table 2). Additional design requirements for nuclear facilities are found in the "-99" sections of the other divisions.</p> <p>A detailed, requirement-by-requirement evaluation of DOE Order 6430.1A has not been prepared for inclusion in this Generic Interim Safety Basis Document. Instead, such evaluations will be prepared for and included in each facility-specific Interim Safety Basis. This approach is being taken because Kaiser Engineers Hanford Company, as the Hanford Site Architectural and Engineering contractor, is responsible for facility design. Accordingly (and appropriately), Westinghouse Hanford Company controlled manuals do not address design requirements in sufficient detail to permit a meaningful, requirement-by-requirement evaluation. Note, however, that DOE Order 6430.1A provides design criteria in varying levels of specificity and that certain of the more general requirements are addressed in certain WHC manuals. For example, Section 1300-4 requires that process designs incorporate sufficient factors of safety so that at least two unlikely and independent changes must occur before a criticality is possible. This is a very general requirement applicable to any facility containing fissile material and is addressed in WHC-CM-4-29, <u>Nuclear Criticality Safety Manual</u>. Section 1300-4 also requires heating or cooling jackets in the safe dimension of geometrically safe vessels to preclude a leak in the jacket that causes an increase in system reactivity. This is a very specific requirement with limited applicability and is not specifically addressed in any WHC manuals.</p>	

Table 1. DOE Order 6430.1A

DIVISION	TITLE
1	General Requirements
2	Site and Civil Engineering
3	Concrete
4	Masonry
5	Metals
6	Wood and Plastics
7	Thermal and Moisture Protection
8	Doors and Windows
9	Finishes
10	Specialties
11	Equipment
12	Furnishings
13	Special Facilities
14	Conveying Systems
15	Mechanical
16	Electrical

Table 2. DOE Order 6430.1A, Division 13

SECTION	TITLE
1300-1	Coverage and Objectives
1300-2	Safety Analysis
1300-3	Safety Class Criteria
1300-4	Nuclear Criticality Safety
1300-5	Source and Special Nuclear Material
1300-6	Radiation Protection
1300-7	Confinement Systems
1300-8	Waste Management
1300-9	Effluent Control and Monitoring
1300-10	Physical Protection, Materials Safeguards, and Storage of Special Nuclear Material
1300-11	Decontamination and Decommissioning
1300-12	Human Factors Engineering
1300-13	Accessibility and Usability by the Physically Handicapped
1304	Plutonium Processing and Handling Facilities
1305	Plutonium Storage Facilities
1306	Unirradiated Enriched Uranium Storage Facilities
1307	Explosives Facilities
1318	Uranium Enrichment Facilities
1319	Uranium Processing and Handling Facilities
1320	Irradiated Fissile Material Storage Facilities
1321	Reprocessing Facilities
1322	Uranium Conversion and Recovery Facilities
1323	Radioactive Liquid Waste Facilities
1324	Radioactive Solid Waste Facilities
1325	Laboratory Facilities
1326	Tritium Facilities
1328	Fusion Test Facilities