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therefore it required breaking into smaller sections.

Document number: SD-MP-SRID-008

Section 1 of 2

Title: Waste Technology Engineering Lab
(324 Bldg.)

Date: 5/27/97 Revision: A000

Originator: Kammenzind, D.E.
Co: BWBC

Recipient: _____

Co: _____

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Section 34

21 ENGINEERING DATA TRANSMITTAL

Page 1 of 6
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FLUOR DANIEL HANFORD COMPANY

STANDARDS

REQUIREMENTS

IDENTIFICATION

DOCUMENT

FACILITY:

*Waste Technology Engineering
Laboratory (324)*

FUNCTIONAL AREA:

Quality Assurance

FOR SIGNATURES SEE NEXT PAGE

FACILITY EXPERT:

J. M. Tanke

Date

RESPONSIBLE FUNCTIONAL AREA MANAGER:

M. S. Wright

Date

INTERPRETIVE AUTHORITY CONCURRENCE:

G. W. Grier/S. A. Byers

Date

WESTINGHOUSE HANFORD COMPANY***STANDARDS******REQUIREMENTS******IDENTIFICATION******DOCUMENT*****FACILITY:**

*Waste Technology Engineering
Laboratory (324)*

FUNCTIONAL AREA:

Quality Assurance

SIGNATURES**FACILITY EXPERT:**

J. M. Tanke

1-10-97

Date

RESPONSIBLE FUNCTIONAL AREA MANAGER:

M. S. Wright

1/10/97

Date

INTERPRETIVE AUTHORITY CONCURRENCE:

G. W. Grier/S. A. Byers

1-10-97

Date

FLUOR DANIEL HANFORD COMPANY***STANDARDS******REQUIREMENTS******IDENTIFICATION******DOCUMENT*****FACILITY:**

*Waste Technology Engineering
Laboratory (324)*

FUNCTIONAL AREA:

Occupational Safety and Health

FOR SIGNATURES SEE NEXT PAGE**FACILITY EXPERT:**

H. W. Ruby

Date

RESPONSIBLE FUNCTIONAL AREA MANAGER:

M. S. Wright

Date

INTERPRETIVE AUTHORITY CONCURRENCE:

J. R. Bell / D. S. Shoop

Date

WESTINGHOUSE HANFORD COMPANY

STANDARDS

REQUIREMENTS

IDENTIFICATION

DOCUMENT

FACILITY: <i>Waste Technology Engineering Laboratory (324)</i>	FUNCTIONAL AREA: <i>Occupational Safety and Health</i>
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SIGNATURES

FACILITY EXPERT: <i>1/15/97</i> H. W. Ruby Date	RESPONSIBLE FUNCTIONAL AREA MANAGER: M. S. Wright <i>1/14/97</i> Date INTERPRETIVE AUTHORITY CONCURRENCE: J. R. Bell / D. S. Shoop <i>1/14/97</i> Date
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FLUOR DANIEL HANFORD COMPANY

STANDARDS

REQUIREMENTS

IDENTIFICATION

DOCUMENT

FACILITY:

*Waste Technology Engineering
Laboratory (324)*

FUNCTIONAL AREA:

Environmental Protection

SIGNATURES

FACILITY EXPERT:

Dan E. Rasmussen 1/30/97
D. E. Rasmussen Date

RESPONSIBLE FUNCTIONAL AREA MANAGER:

M. S. Wright
M. S. Wright

1/30/97
Date

INTERPRETIVE AUTHORITY CONCURRENCE:

W. D. Adair
W. D. Adair

1/30/97 Date

Waste Technology Engineering Laboratory (324 Building)

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Key Words: 324 Building, Standards Requirements Identification
Document, Functional Area

Abstract: This S/RID contains applicable requirements to provide an adequate level of protection for the worker, public health and safety, and the environment for the 324 Building.

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Karen L. Nolan 5/27/97
Release Approval Date

Approved for Public Release

CONTENTS

The 324 Facility Standards/Requirements Identification Document (S/RID) is comprised of twenty functional areas. Two of the twenty functional areas (Decontamination and Decommissioning and Environmental Restoration) were determined as nonapplicable functional areas and one functional area (Research and Development and Experimental Activities) was determined applicable, however, requirements are found in other functional areas and will not be duplicated. Each functional area follows as a separate chapter, either containing the S/RID or a justification for nonapplicability.

The twenty functional areas listed below follow as chapters.

<u>Chapter</u>	<u>Functional Area</u>
1.	Management Systems
2.	Quality Assurance
3.	Configuration Management
4.	Training and Qualification
5.	Emergency Management
6.	Safeguards & Security
7.	Engineering Program
8.	Construction
9.	Operations
10.	Maintenance
11.	Radiation Protection
12.	Fire Protection
13.	Packaging & Transportation
14.	Environmental Restoration
15.	Decontamination & Decommissioning
16.	Waste Management
17.	Research & Development & Experimental Activities
18.	Nuclear Safety
19.	Occupational Safety and Health
20.	Environmental Protection

324 Building

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1.0 Management Systems

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract level S/RID.

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For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

This functional area contains only those requirements which are applicable to 324 building and for which implementation is under control of the facility manager. The FDH Contract S/RID contains additional requirements which are applicable to 324 building but which are implemented by other FDH organizations. In addition, all requirements contained in the 324 building SAR are applicable to 324 building, but are not included within the scope of this S/RID.

The Management Systems Program defined in this document is described in general accordance with the Environment, Safety, and Health Configuration Guide, Revision 0, dated July 30, 1993, and is presented in program elements and subelements. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement. A new element addressing Lessons Learned was added as element 1.9. Key Interfaces was renumbered as 1.10. A reference section was added as element 1.11.

Management Systems provides the policy, commitment, accountability, and resources to implement the ES&H programs and ensure adequate management oversight. The scope of this functional area is the collection of those requirements to be followed by site organization management to develop a program of commitment to ES&H in a formal, controlled manner. Effective management systems are required to develop and maintain ES&H programs, ensure adequate guidance and oversight for the implementation of these programs, and maintain a commitment of resources to perform the required ES&H functions. Management systems establish programs that are typically applicable to all organizations.

The following programmatic elements are addressed by the Management Systems functional area:

- Management and Administration
- Policy and Procedures
- Issue Management
- Compliance Management
- Management Evaluations
- Occurrence Reporting
- Operational Readiness Reviews

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- Document and Database Control-Records Management
- Lessons Learned
- Key Interfaces
- References

Some source documents developed for a specific functional area, such as Operations, contain requirements that can be usefully applied to other functional areas for which corresponding requirements are not available or as well defined. Where requirements are cited in this S/RID from such source documents, application is intended for all other functional areas unless superseded by a program specific requirement or unless the topic being addressed is inappropriate. This approach permits broad application of useful requirements and enhances the level of consistency between functional areas.

Requirements are also included in this S/RID which refer to text elsewhere in the source document, such as examples or other unneeded material, e.g., "... the following list provides examples..." or "... as described in Section..." Such text is not included in this S/RID if the base requirement statement adequately addresses the intended application. This additional text should be reviewed for detail needed to develop policies and procedures which implement the cited requirements.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the

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SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

1.1 Management and Administration

1.1.1 Policies, Plans, and Procedures

Requirement DOE5480.19(920518) Chapter I, Section C.1, cited in the Operations Functional Area, applies to this subelement. Sentences 1, 3, and 4 define the need for policies and procedures to support operations at 324 Building.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter I, Section C.1.

Procedures or other definitive documentation should specify policies that are to be applied for operations. These policies should specify goals and the means to achieve those goals. These documents should also provide for the types of controls necessary to implement policies as discussed in this and other chapters of the guidelines. Operations procedures should support facility and DOE guidance for operations. Responsibilities for implementing these policies, including the responsibility of shift personnel, if applicable, should be clearly defined. Operations personnel should clearly understand their authority, responsibility, accountability, and interfaces with other groups. Physical security should be in accordance with DOE 5630.11.

1.1.2 Organization

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter I, Section C.4.

Workers and their supervisors should be held accountable for operating performance. Personnel involved in significant or frequent violations of operating practices should be counseled, retrained, and disciplined, as appropriate. Supervisor performance appraisals and promotions should include an assessment of operating performance.

1.1.3 Staffing

The primary requirement source document for the qualification aspects of personnel selection, including background, experience, and education, is DOE Order 5480.20A, Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities. General and detailed requirements from this and other source documents applicable to personnel selection and staffing are identified in the Training and Qualification (T&Q) Functional Area.

1.1.4 Training and Qualification

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The primary requirement source document for personnel training is DOE Order 5480.20A, Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities. General and detailed requirements from this and other source documents applicable to personnel training are identified in the T&Q Functional Area.

Responsible authorities of the various programs should interface closely with the T&Q Functional Area to coordinate development of training modules and determine the most effective way to accomplish the various types of training, e.g., what type of training would be most effective and which organization should develop and deliver the training.

1.2 Policy and Procedures

Author's Note: The requirements from DOE5480.19 are implemented for operating procedures, with the exception of test procedures in the 324 building Requirement Source 10CFR830 Part 120(c)(2)(i) is the requirement that drives the Plutonium Process Support Laboratory (PPSL) test procedures.

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(2)(i)

Work Processes. Work shall be performed to established technical standards and administrative controls using approved instructions, procedures, or other appropriate means. Items shall be identified and controlled to ensure their proper use. Items shall be maintained to prevent their damage, loss, or deterioration. Equipment used for process monitoring or data collection shall be calibrated and maintained.

1.2.1 Preparation

Requirement DOE 5480.19(920518) Chapter I, Section C.1, cited in the Operations Functional Area, applies to this sub-element. Sentence 2 defines the general content of policies governing 324 building activities.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.1., Paragraphs 1 and 2

To ensure consistency among operations procedures, the methods for developing new procedures, including procedure formats, should be clearly defined. Administrative procedures and/or writers' guides should direct the development and review process for procedures.

Procedures should be developed for all anticipated operations, evolutions, tests, and abnormal or emergency situations. Annunciator/alarm response procedures that guide the operator in verifying

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abnormal conditions or changes in plant status and provide the appropriate corrective action should be developed for all alarm panels. All procedures should provide administrative and technical direction to conduct the intent of the procedure effectively. The extent of detail in a procedure should depend on the complexity of the task, the experience and training of the user(s), the frequency of performance, and the significance of the consequences of error.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.a., Sentence 1

The scope and applicability of individual procedures should be readily apparent.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.a., Sentence 3

In addition, to enhance rapid retrieval, emergency procedures should be distinguishable from other procedures.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.b.

Procedures should incorporate appropriate information from applicable source documents, such as the facility design documents, safety analysis documents, and vendor technical manuals.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.c., Sentence 1

Prerequisites and initial conditions should be detailed.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.d.

Definitions used in the procedure should be explained.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.e.

Procedures should be easily understood, and actions should be clearly stated.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.f.

Procedures should contain only one action per step.

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REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.g., Sentence 1

Procedures should contain sufficient but not excessive detail.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.h., Sentence 1

Warnings, notes, and cautions should be easily identifiable and should not contain action statements.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.i., Sentences 1 and 2

Warnings and cautions should precede the step to which they apply. Warnings, notes, and cautions should appear on the same page as the step to which they apply.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.j.

Procedures should be technically and administratively accurate (i.e., the instructions and information should be correct; referenced documents should be correctly identified; and necessary instructions should be present to guide the user when transferring between procedures).

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.k.

Individual sign-offs should be provided for selected critical steps. One sign-off should not be applied to more than one action.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.n., Sentence 1

Sequence of procedural steps should conform to the normal or expected operational sequence.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.2.o., Sentence 1

Procedures should be developed with consideration for the human-factor aspects of their intended use.

1.2.2 Review and Approval

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REQUIREMENT SOURCE: DOE ORDER 4330.4B, Chapter II, Section 6.3.4

Approval should be consistent with facility technical specifications or their equivalent and administrative procedures. As a minimum, the maintenance manager or designee should approve maintenance procedures.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.4., Paragraphs 1 and 2, Sentence 1

Operating procedures should be approved by the operations supervisor. In addition, procedures that affect safety-related equipment and emergency procedures should be reviewed by the facility safety review committee or by another appropriate review mechanism. Procedure revisions should receive the same depth of review and level of approval as the initial versions. New and revised procedures should be approved prior to use.

Changes in Operations procedure that do not affect the intent of operations procedure should be approved by two individuals; one should be a qualified operator, and the other should be a member of facility management.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.5.

New and revised operations procedures should be reviewed prior to issuance and at periodic intervals to ensure that the information and instructions are technically accurate and that appropriate human-factor considerations have been included. The frequency of subsequent reviews should be specified; it may vary with the type and complexity of the activity involved and with time as a given plant reaches operational maturity. Applicable procedures should be reviewed after an unusual incident (such as an accident, an unexpected transient, significant operator error, or equipment malfunction). During reviews, procedures should be compared to source documents to verify their accuracy. In addition, new procedures should be validated by walk-throughs in the facility or by operation on a facility-specific simulator to ensure workability.

1.2.3 Control and Maintenance

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VIII, Section C.10.

A system should be established to ensure that the operations personnel receive and utilize the latest revisions of engineering drawings and specifications. Operations personnel should be made aware of all changes to these documents. The document distribution should include all operations related activities such as procedures review groups, maintenance groups, facility safety analysis groups, and testing groups.

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REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.3., Sentence 2

The review and approval process for each procedure change or revision should be documented.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.3., Sentence 6

Procedure changes do not involve retyping or reissuing a procedure. "Procedure revisions" constitute a new, retyped edition of the procedure. Procedure changes and revisions should conform to the following practices:

- a. Procedure changes intended for use more than one time should be documented in a location readily available for operator reference. To avoid the possibility of error, these changes should also be referenced in procedure copies used by operators.
- b. Appropriate procedure changes and revisions should be initiated when procedure inadequacies or errors are noted.
- c. Procedure revisions should be initiated when a change has been outstanding for an extended period (e.g., greater than 6 months) or when a procedure has been affected by several changes (e.g., more than five). All currently effective procedure changes should normally be incorporated when the procedure is revised.
- d. Procedure revisions should be implemented concurrently with modifications. Procedure updates required by temporary modifications should be handled as procedure "change" and implemented concurrently with the temporary modification installation.
- e. Important information regarding changed or revised procedures should be communicated to appropriate operations personnel via the required reading system (Chapter XIV), a pre-shift briefing, or a similar method.
- f. Documentation of the reason for key procedure steps should be maintained and reviewed when implementing changes or revisions that alter these steps. This practice is important to ensure that the reason for any step is not overlooked.
- g. The review process should involve verification and validation of the procedure using walkthroughs or similar methods.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.6., Paragraph 1, Sentence 1

A controlled copy of all operations procedures should be maintained in the control area for

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operator reference, and selected controlled procedures should be maintained at other appropriate locations.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter XVI, Section C.7.

Facility operation should be conducted in accordance with applicable procedures that reflect the facility design basis. The requirements for use of procedures should be clearly defined and understood by all operators. If procedures are deficient, a procedure change should be initiated. In exception to this policy, operators may take whatever action is necessary during emergency conditions to place the facility in a safe condition, and to protect equipment, personnel, and public safety without first initiating a procedure change.

Operators should have procedures with them and follow them in a step-by-step manner when the procedures contain sign-offs for the various activities. In addition, procedures should be referenced during infrequent or unusual evolutions when the operator is not intimately familiar with the procedure requirements or when errors could cause significant adverse impact to the facility. Operators need not reference emergency procedures during the performance of immediate actions since these actions, are committed to memory; however, the emergency procedure immediate action instructions should be reviewed after the actions are performed, thus, verifying, that all required actions have been taken.

1.3 Issue Management

Issue Management is implemented at the 324 building in accordance with the requirements defined in the QA Functional Area.

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(1)(iii)

Quality Improvement. Processes to detect and prevent quality problems shall be established and implemented. Items, services, and processes that do not meet established requirements shall be identified, controlled, and corrected according to the importance of the problem and the work affected. Correction shall include identifying the causes of problems and working to prevent recurrence. Item characteristics, process implementation, and other quality-related information shall be reviewed and the data analyzed to identify items, services, and processes needing improvement.

1.3.1 Issue Identification

REQUIREMENT SOURCE: DOE ORDER 4330.4B, Preamble, Section 10.b, Sentence 1

Periodic inspections of structures, systems, components, and equipment, particularly those important to the safe and reliable operation of a facility, shall be performed to determine whether

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deterioration is taking place and to identify and address technical obsolescence that threatens performance, safety, or facility preservation.

REQUIREMENT SOURCE: DOE ORDER 4330.4B, Preamble, Section 10.b, Sentence 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. References in Paragraphs 5b and k apply.

REQUIREMENT SOURCE: DOE ORDER 5480.29, Preamble, Section 3, Sentence 3, and 3.a thru 3.d

Situations by which a DOE, contractor, or subcontractor employee may choose to file an employee concern include:

- a. The need to express an ES&H concern through a nonroutine reporting pathway because the employee is dissatisfied with the effectiveness of existing employee concerns program procedures (for the purpose of this order, unless otherwise specified, employee is to mean DOE, contractor, and subcontractor employees);
- b. Fear of potential reprimand, retaliation, or duress as a result of filing a concern within the routine management chain or other existing reporting systems;
- c. Belief that corrective actions for previously identified concerns are not being implemented; or
- d. The lack of an employee concerns program within a DOE contractor or subcontractor organization.

REQUIREMENT SOURCE: DOE ORDER 5480.29, Preamble, Section 5.b

Employee concern reports shall be managed in a manner that assures prompt identification, prioritization, evaluation, corrective and protective response, and resolution of employee concerns raised by DOE, contractor, and subcontractor employees;

1.3.2 Issue Evaluation

REQUIREMENT SOURCE: DOE ORDER 5480.29, Preamble, Section 9.d

The following are intended to be illustrative, but not all inclusive, of criteria which should be utilized to assess the significance of the concern. Immediate significance is judged by determining whether the concern involves:

- (1) Initiation of work in the face of identified environment, safety, or health concerns which could

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result in an immediate or nearterm threat to the safety of the public or workers;

(2) Continuation of operations in the face of inoperable or deficient ES&H equipment, monitoring instrumentation, or systems;

(3) Any violations of PAAA enforcement authority criminal acts involving nuclear safety matters (e.g., falsification of plant logs and records), other willful violations of DOE rules, Orders, and regulations; operational procedures, specification limits, or criminal acts;

(4) Deficiencies observed in the normal reporting system (i.e., lack of notification of ES&H issues and events of significance to proper authorities as required by DOE Orders, procedures, and Federal and State environmental laws);

(5) The collection, dissemination, and recording of inaccurate or falsified ES&H related data; or

(6) Material misrepresentations to inspectors, auditors, or reviewers when performing official duties.

1.3.3 Root Cause and Corrective Action Analysis

REQUIREMENT SOURCE: DOE ORDER 4330.4B, Chapter II, Section 17.3.3, Paragraph 1, Sentence 1 and 2

The above actual or probable causes of a problem should be evaluated by one or more techniques or methodologies to establish a final root cause. An acceptable root cause should meet three criteria: (a) its correction should prevent recurrence of the unplanned occurrence; (b) its correction should be feasible; and (c) its correction should not adversely impact safety, reliability, or operational goals.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.5.d., Sentence 1

Appropriate corrective action should be established for each event investigation, and specific personnel should be assigned responsibilities for the corrective action.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.5.d., Sentence 3

The final approval for corrective action should be made by the facility manager.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.6., Paragraph 1

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An investigative report should be prepared in a timeframe determined by the responsible authority. The report should include a description of the event (including pertinent conditions), a discussion of the impact of the event, root cause, the lessons learned, and the proposed corrective action(s). The report should include positive aspects of the event (such as particularly effective personnel responses). The investigative report should be approved by the facility manager and reviewed by appropriate supervisors, managers, and the safety review committee.

1.4 Compliance Management

Author's Note: This S/RID is being developed as part of the implementation of DNFSB recommendation 90-2. It provides a primary tool of the compliance management program.

1.5 Management Evaluation

1.5.1 Performance Improvement Assessment

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter I, Section C.3., Paragraph 5, Sentences 2 through 4

Line managers and supervisors should perform routine observations of personnel performing operating activities. Deficiencies identified should be documented, trended, and corrected. Also, other groups, such as quality assurance personnel, should periodically review and assess operation performance.

REQUIREMENT SOURCE: DOE ORDER 5480.26, Section 6.f Introduction, and 6.f.(1)

Facility Managers. As defined in paragraph 4 of this Order shall:

(1) Assess facility Performance Indicators and other operations information, such as reportable occurrences, for trends in improving or deterioration conditions; and

REQUIREMENT SOURCE: DOE ORDER 5480.26, Section 7.b.(1), Sentence 2

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.

REQUIREMENT SOURCE: DOE ORDER 5482.1B, Revision C01, Section 9.d(1)

Internal appraisals shall be conducted at the operating level by persons not directly responsible for performance of the activities being appraised.

REQUIREMENT SOURCE: DOE ORDER 5482.1B, Revision C01, Section 9.d(2), (a) thru

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(f)

The internal appraisal system shall:

- a) Function primarily in an advisory capacity to a designated position or management authority so that corrective actions can be taken.
- b) Be clearly defined in writing.
- c) Be auditable.
- d) Be reviewed by management for adequacy of performance every 3 years, or more often, as required.
- e) Review the overall operation of each facility with sufficient frequency to assure adequate ES&H coverage.
- f) Provide multidisciplinary reviews with in-depth technical competence in the areas being reviewed.

1.5.2 Performance Indicators

REQUIREMENT SOURCE: DOE ORDER 5480.26, Section 7.a.(3)

Performance Indicators are designed to be reportable as numerical values on a consistent basis so that they are readily usable in trending analysis. 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.

REQUIREMENT SOURCE: DOE ORDER 5480.26, Section 7.c

Reportable Performance Indicators. The Performance Indicators delineated in DOE-STD-1048-92 are the minimum required to be reported for each facility. For some facilities, certain information may not be applicable and, therefore, need not be reported. However, the report should so indicate. It is also expected that DOE line management may request additional Performance Indicators to be reported which they may determine to be relevant to their facilities. Detailed definitions and information concerning these PIs can be found in DOE-STD-1048-92.

1.5.3 Indicator Trending and Analysis

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.8.

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Patterns of deficiencies such as operator errors or inadequate procedures should be trended. A periodic summary report of events, causes, and trends should be submitted to department heads, the facility manager, and appropriate managers. Department heads should ensure training programs include appropriate material from the summary report.

1.5.4 Indicator Reporting

REQUIREMENT SOURCE: DOE ORDER 5480.26, Section 7.a.(2)

Departmental elements not included in the formal DOE PI Program shall internally establish and track operations using PIs appropriate to their organizations but are excluded from formal reporting requirements defined in DOE-STD-1048-92.

1.6 Occurrence Reporting

Emergency classification requirements are found in the Emergency Management Functional Area.

REQUIREMENT SOURCE: DOE-O-232.1, Part 4.

Author's Note: DOE Manual 232.1-1 provides detailed information for categorizing and reporting occurrences at DOE facilities. It complements DOE O 232.1 and its use is required by that Order.

REQUIREMENTS.

DOE M 232.1-1, OCCURRENCE REPORTING AND PROCESSING OF OPERATIONS INFORMATION, is required to implement this Order.

REQUIREMENT SOURCE: DOE-O-232.1, Part 4.c. Introduction, and 4.c.(1)

Departmental Elements and contractors at facilities shall do the following:

(1) Develop or revise implementing procedures for the Occurrence Reporting Program at their facility to ensure appropriate categorization, notification, reporting, and investigating of events and/or conditions.

(a) On the effective date of this Order, all reporting requirements of this Order shall be implemented except for the submittal and approval of the site implementing procedures.

(b) Implementation procedures shall be submitted for approval to the respective DOE Secretarial Office within 4 months after approval of this Order.

(c) Implementation procedures submitted by the contractor or facility operator shall be considered automatically approved 2 months after submittal, if they are not deliberately approved or rejected

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by DOE prior to the automatic approval.

(d) Pending approval of new or modified implementing procedures, the procedures approved and in effect as of the effective date of this Order may be used.

1.6.1 Identification and Categorization

REQUIREMENT SOURCE: DOE-O-232.1, Part 4.a.

Immediately following an occurrence, DOE-owned or -operated facility staff and operators shall:

- (1) ensure that appropriate immediate response(s) are taken to stabilize or return the facility/operation to a safe condition; and
- (2) identify and promptly notify the Facility Manager of abnormal events and conditions and record and archive appropriate information pertaining to such occurrences.

REQUIREMENT SOURCE: DOE-O-232.1, Part 4.b. Introduction, and 4.b.(1)

b. Departmental Elements and contractors responsible for DOE-owned or -operated facilities shall ensure a Facility Manager or Facility Manager Designee is available at all times to carry out the following requirements.

(1) Perform categorization of the event.

(a) If the event is categorized as an Emergency in accordance with the DOE 5500 series Orders, then make the notification of the Emergency as required in the DOE 5500 series Orders and prepare the written Occurrence Reports in accordance with this Order.

(b) If the event is not categorized as an Emergency, then categorize the event as an Unusual or Off-Normal Occurrence as soon as practical but, in all cases, within 2 hours of identification.

(c) If the category is not clear or the occurrence exceeds the threshold of more than one criteria, the occurrence shall be categorized at the higher level being considered. As an example, discovery of a defective item, material, or service, normally reportable as an Off Normal Occurrence, that caused the reduction of safety margin below that prescribed in the authorization basis, would be reported as an Unusual Occurrence.

(d) The occurrence category shall either be elevated, maintained, or lowered as information is made available.

1.6.2 Notification and Reporting

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REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VII, Section C.1.

Procedures should be developed to address appropriate notifications and should include the following elements:

- a. Specific responsibilities for notifications;
- b. Identification of events and conditions requiring notifications;
- c. Identification of primary and alternate personnel to be notified for various situations;
- d. Establishment of time requirements for notifications that are consistent with the facility emergency plan; and
- e. Definition of recordkeeping requirements that documents the reason for notifications, the time of notifications, and the person notified.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VII, Section C.2., Sentence 1

The operations supervisor should ensure that all appropriate personnel receive notification when required.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VII, Section C.3.

Names of primary and alternate contacts and current phone numbers and page codes should be readily available to the person assigned to make the notifications.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VII, Section C.4., Sentence 1

All notifications should be documented.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VII, Section C.5.

Adequate communication equipment should be maintained in the main control area to meet the objectives of this chapter.

REQUIREMENT SOURCE: DOE-O-232.1, Part 4.b.(2) Introduction

Notify the DOE Facility Representative and the HQ Emergency Operations Center (HQ EOC) of an Unusual Occurrence as soon as practical but, in all cases, within 2 hours of categorization.

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REQUIREMENT SOURCE: DOE-O-232.1, Part 4.b.(3)

Prepare and submit a Notification Report as soon as practical but, in all cases, before the close of the next business day from the time of categorization (not to exceed 80 hours).

REQUIREMENT SOURCE: DOE-O-232.1, Part 4.b.(4)

Prepare and submit an Update Report when significant and new information is available or upon request of DOE.

REQUIREMENT SOURCE: DOE-O-232.1, Part 4.b.(5)

Document any changes in categorization in an Update Report and submit before the close of the next business day from the time of recategorization (not to exceed 80 hours).

REQUIREMENT SOURCE: DOE-O-232.1, Part 4.b.(6)

Prepare and submit a Final Report to the DOE Facility Representative when the root cause of the occurrence has been analyzed, corrective actions determined and scheduled, and lessons learned identified. Submit the Final Report as soon as possible, but no later than 45 calendar days after initial categorization.

1.6.3 Investigation

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.1., Sentences 1 through 3

Events that occur in the facility and adversely affect operations, personnel safety, or DOE requirements (DOE 5000.3A) should receive a thorough investigation. The criteria for when to perform an event investigation should be clearly established. Specific events requiring investigation should be listed for supervisory use, along with criteria for use in deciding what "near miss" situations should receive review.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.2., Sentence 1

The operations supervisor or another manager should be responsible for event investigations.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.4., Paragraph 1, Sentence 5

Information should be gathered in the following areas:

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- a. Initial facility conditions.
- b. Statements of operators and personnel involved in the event (this should be permanently recorded).
- c. Pertinent computed printouts (post-trip log sequence of events) and strip charts.
- d. Pertinent documentation (such as operator logs, radiation work permits, chemistry logs, and radiological surveys) as required to establish conditions prior to and during the event.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.4., Paragraph 1, Sentences 1 through 3

Sufficient data must be collected to allow the event investigators to perform a reconstruction and analysis of the event. An individual should be assigned responsibility for collecting the required information and assembling the information for review. It is important to collect the necessary information as soon as possible after the event.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.4., Paragraph 2, Sentence 3

Methods for collecting this information can vary; however, the event investigation containing relevant information should be permanently recorded for future reference.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.4., Paragraph 3, Sentences 2 and 3

The collection of data should not interfere with the continued operation of the facility. Temporary interference should occur only if necessary to understand the event.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.5., Sentence 1

Upon completion of the data collection, a structured review of the abnormal event should occur.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.5., Sentence 3

Each event investigation should include the following steps, with emphasis placed on each individual step depending upon the severity or potential consequences of the event.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.5.a., Sentence 1

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The abnormal event should be reconstructed using the collected information.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.5.b., Sentences 1 through 4

Once the facts of the event have been established, the event should be analyzed to determine the response of equipment and involved personnel. During the analysis, emphasis should be placed on determining the proper response of systems, comparison of actual and expected response, adequacy of procedures, and factors affecting human performance. When available, the event should be compared with previous event investigations of similar events or transients. During the analysis, a safety evaluation should be performed to ascertain the proper response of equipment and to identify detrimental effects on facility equipment.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.5.c., Sentence 1

The root cause of the event should be determined.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.9., Sentence 2

If an act of sabotage is discovered or suspected, it is important to begin an investigation immediately and to accomplish the following:

- a. Determine the condition of the affected system(s) and ensure the operability of all safety-related systems;
- b. Decide if continued operation is justified or if systems are available to support safe facility shutdown; and
- c. Minimize the impact of discovered acts of sabotage and deter future acts of sabotage.

1.6.4 Tracking

REQUIREMENT SOURCE: DOE-O-232.1, Part 4.b.(7)

If the required analysis cannot be completed within 45 calendar days, submit an Update Report within the 45 days and include a detailed explanation of the delay and an estimated date for submittal of the Final Report.

REQUIREMENT SOURCE: DOE-O-232.1, Part 4.b.(8)

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If the Final Report was rejected by either the Facility Representative or Program Manager, prepare and resubmit the revised Final Report within 21 calendar days of disapproval.

1.7 Operational Readiness Reviews

Operational Readiness Reviews (ORRs) will be conducted in accordance with RLID 425.1, section 2.2, Operational Readiness Review.

Readiness Assessments (RA) will be conducted in accordance with RLID 425.1, section 2.3, Readiness Assessments.

Operational Readiness Reviews (ORRs) provides a structured methodology for determining that a facility, project, process, or activity is ready to be occupied and/or operated in a safe and controlled manner. For the remainder of this section the term "facility" will be used to include a facility, project, process, or activity.

It is DOE policy that no new hazardous or nuclear facilities be started, nor should such existing facilities be restarted, without a documented and approved review or readiness. The process is applied on a graded approach, which addresses all key elements of ORR. The ORR process includes, among other things, a determination of the level of compliance with ES&H Orders and OSHA regulations.

DOE 425.1 establishes the actions to be taken, and assigns responsibility for authorizing the restart of nuclear facilities. RLID 425.1 in turn implements the requirements of the order at the Hanford site.

This element identifies specific requirements to be addressed in determining the need for an conducting FDH ORRs at the Hanford site. DOE or other approvals necessary to proceed with an ORR or facility are identified. Interfaces and coordination with oversight organizations necessary for FDH ORRs are identified if specified in the requirement documents.

This element interfaces with all programs and functional area involved in the start, restart, operation, or support of a given facility.

1.7.1 Approach and Organization

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.a.(1)

Operational Readiness Review. Contractor management shall determine if Operational Readiness Reviews are required for startup of new nuclear facilities or restart of a nuclear facility using the

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requirements given below. Contractors shall conduct an Operational Readiness Review when any of the following conditions occur.

- (a) Initial startups of new hazard categories 1, 2, and 3 nuclear facilities.
- (b) Restart after a nuclear facility unplanned shutdown directed by a DOE management official for safety or other appropriate reasons.
- (c) Restart after an extended shutdown for hazard categories 1 and 2 nuclear facilities. Extended shutdown for a hazard category 1 nuclear facility is 6 months. Extended shutdown for a hazard category 2 nuclear facility is 12 months.
- (d) Restart of hazard categories 1 and 2 nuclear facilities after substantial process, system, or facility modifications that require changes in the safety basis previously approved by DOE.
- (e) Restart after a nuclear facility shutdown because of operations outside the safety basis.
- (f) When deemed appropriate by DOE management officials, including restarts of hazard category 3 nuclear facilities.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.a.(2), sentences 1 thru 4

Readiness Assessment. For restarts of nuclear facilities not requiring an Operational Readiness Review, contractor management shall evaluate the need for performing a Readiness Assessment prior to restart. This includes the startup or restart of program work within operating facilities when the new or restarted program work does not require DOE approval of changes to facility limits or requirements as stated in Operational Safety Requirements/Technical Safety Requirements (OSRs/TSRs), Basis for Interim Operations/Safety Analysis Reports (BIO/SARs), or other equivalent authorization basis documents. When a Readiness Assessment is required, the contractor shall use procedures developed by the Operations Offices to gain Operations Office approval of the startup or restart of nuclear facilities. If a Readiness Assessment is not to be performed, the contractor's standard procedures for startup or restart will be used.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.a.(3)

Authorization Authority. For nuclear facility startup or restart actions, the contractor shall determine the authorization authority for startup or restart approval by the following.

- (a) For initial startups of new hazard categories 1 and 2 nuclear facilities, the Secretary of Energy (or designee) shall approve startup. For initial startups of new hazard category 3 nuclear facilities, the Secretarial Officer (or designee) shall approve startup. If other DOE Orders require

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a higher level of startup authorization than this CRD, the official described in this CRD will recommend startup to the higher level official.

- (b) For shutdowns directed by a DOE management official for safety or other appropriate reasons, authorization to restart shall be granted by an official of a level commensurate with the official ordering the shutdown unless a higher level is designated by the Secretarial Officer.
- (c) For extended shutdowns of hazard category 1 nuclear facilities, the Secretarial Officer shall approve restart. For extended shutdowns of hazard category 2 nuclear facilities, the Secretarial Officer, or designee, shall approve restart.
- (d) For shutdowns because of substantial plant or facility modifications of hazard category 1 nuclear facilities which require changes in the safety basis previously approved by DOE, the Secretarial Officer shall approve restart. For such shutdowns of hazard category 2 nuclear facilities, the Secretarial Officer (or designee) shall approve restart.
- (e) For facility shutdowns due to operations outside the safety basis, the official approving restart shall be commensurate with the approval authority for the safety basis. If the safety basis was approved by a Headquarters official, the Secretarial Officer (or designee) shall approve restart. If the safety basis was approved by a field official, the Operations Office Manager (or designee) shall approve restart.
- (f) For startups or restarts of nuclear facilities for which Operational Readiness Reviews were required as a result of a DOE official deeming it appropriate, the official approving startup or restart shall be of a level commensurate with the official directing the review. If a Headquarters official directed an Operational Readiness Review be performed, the Secretarial Officer (or designee) shall approve the startup or restart. If a field official directed an Operational Readiness Review, the Operations Office Manager (or designee) shall approve the startup or restart.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.b.(4)

Operational Readiness Review Teams.

- (a) Contractor management shall appoint Operational Readiness Review teams in accordance with the following qualifications and training requirements:
 - 1 Technical knowledge of the area assigned for evaluation, including experience working in the technical area.
 - 2 Knowledge of performance-based assessment processes and methods.
 - 3 Knowledge of facility-specific information.

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(b) The Operational Readiness Review team shall not include as senior members (including team leader) individuals from offices assigned direct line management responsibility for the work being reviewed; any exceptions require approval of the startup or restart authority. Additionally, no Operational Readiness Review team member should review work for which he or she is directly responsible.

(c) The Operational Readiness Review team leader shall determine and document qualifications of Operational Readiness Review team members.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.b.(5)

Criteria and Review Approaches. The contractor's Operational Readiness Review team shall determine the criteria and review approaches to be used for the review based on the approved breadth given in the plan-of-action and document the criteria and review approaches in the Operational Readiness Review Implementation Plan.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.c.(1)

Requirements Applicable to Startup or Restarts of Nuclear Facilities Involving Readiness Assessments.

(1) Readiness Assessment Procedures. The contractor shall establish procedures that define when a Readiness Assessment is required and provide requirements for conduct of readiness assessments including procedures by which contractors will gain Operations Office approval of the startup or restart of nuclear facilities. The procedures shall require submittal of a startup notification report to obtain approval to use a Readiness Assessment and preparation of a formal plan-of-action that includes, as a minimum, the breadth of the assessment, team leader designation, and prerequisites for the assessment and shall be approved by the startup or restart authority. For shutdowns directed by contractor management, these procedures may indicate that, except for serious safety reasons, the contractor management may be the startup or restart authority.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.c.(2)

Graded Approach. Contractor Readiness Assessment procedures shall specify a graded approach to the tenets of Operational Readiness requirements specified in this CRD. The procedures should indicate that the Readiness Assessment may be as short and simple as a restart check procedure, or that it may approach the breadth and depth of an Operational Readiness Review, depending on the causes and duration of the shutdown and the modifications accomplished during the shutdown.

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REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.c.(3)

Approval. The startup or restart authority, as designated by the Operations Office Manager or designee, may approve the startups or restarts after any prestart findings are corrected.

REQUIREMENT SOURCE: RLID 425.1, Section 2.1, paragraph 3(1)

(1) Contractor

Quarterly develop SNR in the format of Exhibit 4.1 and submit to RL Line Management with a copy to Waste Operations Division (WOD). (See RLID 425.1, for referenced Exhibit)

1.7.2 Plan of Action

The applicability of RLID 425.1 to non-nuclear activities will be addressed during the development and RL approval of the Plan(s) of Action (POA).

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.b.(2)

Breadth of Operational Readiness Review. The contractor shall develop the breadth of the Operational Readiness Review and document it in the plan-of-action. A minimum set of core requirements, as defined in the core requirements (paragraph 2d, below) shall be addressed when developing the breadth of the Operational Readiness Review. The plan-of-action may reference a timely, independent review that addressed the requirement in a technically satisfactory manner to justify not performing further evaluation of a core requirement, or portion thereof, during the Operational Readiness Review. The breadth may be expanded at a later time by the Operational Readiness Review team, if appropriate.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.b.(3)

Operational Readiness Review Plans-of-Action, Approval and Content. The contractor's Operational Readiness Review plan-of-action shall be approved by the appropriate startup or restart authorities. The contractor's plan-of-action shall specify the prerequisites for starting the responsible contractor's Operational Readiness Review; the prerequisites shall address each core requirement of paragraph 2d, below, determined to be applicable when developing the scope of the Operational Readiness Review. The contractor plan-of-action shall be provided to EH for review and comment.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.b.(6)

Approve and Use Implementation Plans. The contractor's Operational Readiness Review team leader shall approve the Implementation Plan and use it to conduct the Operational Readiness Review. The Implementation Plan shall be provided to EH for review and comment.

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REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.b.(7)

Certification and Verification. The responsible contractor shall certify by correspondence to DOE line management that the facility is ready to startup or restart and that this has been verified by the contractor Operational Readiness Review.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(1)

Minimum Core Requirements. Each of the minimum core requirements listed below, shall be addressed when developing the breadth of an Operational Readiness Review. Justification shall be provided in the plan-of-action, prepared in accordance with paragraphs 2b(2) and (3), above, of this CRD, if it is determined that a particular core requirement will not be reviewed. The plan-of-action may reference a timely, independent review that addressed the requirements in a technically sound manner to justify not performing further evaluation of a core requirement during an Operational Readiness Review.

(1) There are adequate and correct procedures and safety limits for operating the process systems and utility systems.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(2)

Training and qualification programs for operations and operations support personnel have been established, documented, and implemented. (The training and qualification program encompasses the range of duties and activities required to be performed.)

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(3)

Level of knowledge of operations and operations support personnel is adequate based on reviews of examinations and examination results and selected interviews of operating and operations support personnel.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(4)

Facility safety documentation is in place that describes the "safety envelope" of the facility. The safety documentation should characterize the hazards/risks associated with the facility and should identify mitigating measures (systems, procedures, administrative controls, etc.) that protect workers and the public from those hazards/risks. Safety systems and systems essential to worker and public safety are defined and a system to maintain control over the design and modification of

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facilities and safety-related utility systems is established.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(5)

A program is in place to confirm and periodically reconfirm the condition and operability of safety systems, including safety related process systems and safety related utility systems. This includes examinations of records of tests and calibration of safety system and other instruments that monitor limiting conditions of operation or that satisfy Technical Safety Requirements. All systems are currently operable and in a satisfactory condition.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(6)

A process has been established to identify, evaluate, and resolve deficiencies and recommendations made by oversight groups, official review teams, audit organizations, and the operating contractor.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(7)

A systematic review of the facility's conformance to applicable DOE Orders has been performed, any nonconformances have been identified, and schedules for gaining compliance have been justified in writing and formally approved.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(8)

Management programs are established, sufficient numbers of qualified personnel are provided, and adequate facilities and equipment are available to ensure operational support services (e.g., training, maintenance, waste management, environmental protection, industrial safety and hygiene, radiological protection and health physics, emergency preparedness, fire protection, quality assurance, criticality safety, and engineering) are adequate for operations.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(9)

A routine and emergency operations drill program, including program records, has been established and implemented.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(10)

An adequate startup or restart test program has been developed that includes adequate plans for graded operations testing to simultaneously confirm operability of equipment, the viability of procedures, and the training of operators.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(11)

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Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, and effectively implemented with line management responsibility for control of safety.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(12)

The implementation status for DOE 5480.19, CONDUCT OF OPERATIONS REQUIREMENTS FOR DOE FACILITIES, of 7-9-90, is adequate for operations.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(13)

There are sufficient numbers of qualified personnel, to support safe operations.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(14)

A program is established to promote a site-wide culture in which personnel exhibit an awareness of public and worker safety, health, and environmental protection requirements and, through their actions, demonstrate a high priority commitment to comply with these requirements

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(15)

The facility systems and procedures, as affected by facility modifications, are consistent with the description of the facility, procedures, and accident analysis included in the safety basis.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(16)

The technical and managerial qualifications of those personnel at the DOE Field organization and at DOE Headquarters who have been assigned responsibilities for providing direction and guidance to the contractor, including the Facility Representatives, are adequate (DOE Operational Readiness Review only).

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(17)

The breadth, depth, and results of the responsible contractor Operational Readiness Review are adequate to verify the readiness of hardware, personnel, and management programs for operations (DOE Operational Readiness Review only).

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(18)

Modifications to the facility have been reviewed for potential impacts on procedures and training and qualification. Procedures have been revised to reflect these modifications and training has been performed to these revised procedures.

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REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(19)

The technical and management qualifications of contractor personnel responsible for facility operations are adequate.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.d.(20)

DOE Operations Office Oversight Programs, such as Occurrence Reporting, Facility Representative, Corrective Action, and Quality Assurance Programs, are adequate (DOE Operational Readiness Review only).

REQUIREMENT SOURCE: RLID 425.1, Preamble, Section 6.0b.

RL Contractors. RL contractors with responsibility to perform ORRs or RAs are required to prepare implementing procedures within 45 days of receipt of this Directive and submit to Director, Waste Operations Division for review and concurrence.

REQUIREMENT SOURCE: RLID 425.1, Section 2.1, paragraph 3

It is incumbent upon the contractor to notify RL Line Management when an unplanned shutdown requires an ORR or RA for restart. This notification shall be made in writing as soon as possible and include all the information required by Exhibit 4.1(See RLID 425.1, for referenced Exhibit).

REQUIREMENT SOURCE: RLID 425.1, Section 2.2(9), bullet 1

(9) Facility Contractor

Provide electronic copy of POA to RL Line Management.

REQUIREMENT SOURCE: RLID 425.1, Section 2.3.1(1), bullet 1

(1) Facility contractor.

At least four months prior to planned startup or as soon as possible for unplanned restarts develop the MOU. The MOU shall contain the information required by Exhibit 4.4. (See RLID 425.1, for referenced Exhibit)

1.7.3 Tracking and Closure of Findings

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Requirements which specify the process for tracking and closure of review findings, including independent verification of closure, are specified in this subelement.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.b.(9)

Closure of Prestart Findings. The mechanism for closure of Operational Readiness Review prestart findings shall include:

- (a) Development of action plans, approved by DOE, to correct the findings; and
- (b) Documentation of completion of response actions responding to the findings in a closure package.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.b.(10)

Resolution of Prestart Findings. The contractor shall satisfactorily resolve all prestart findings of the DOE Operational Readiness Review prior to startup or restart of the facility.

1.7.4 Documentation

Requirements identified in this subelement specify documentation of the ORR, including the final ORR Report and the Readiness to Proceed Memorandum submitted for DOE approval and initiation of the DOE ORR process. Requirements pertaining to maintenance of records and documents are addressed in section 1.8 of this S/RID.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.b.(1)

Requirements Applicable to Startups or Restarts of Nuclear Facilities Involving Operational Readiness Reviews. (These requirements are listed sequentially.)

- (1) Operational Readiness Review Documentation. For Operational Readiness Reviews, contractors shall prepare the following documents: startup/restart notification reports, plans-of-action, Operational Readiness Reviews Implementation Plans, and final reports. The resolution of all findings from the Operational Readiness Reviews shall be documented and maintained with the plan-of-action, Implementation Plan, and final report.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.b.(8)

Final Report.

- (a) Upon completion of the contractor or DOE Operational Readiness Review, DOE line management shall ensure a final report is prepared and approved by the Operational Readiness Review team leader. The final report shall document the results of the Operational Readiness

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Review and make a conclusion as to whether startup or restart of the nuclear facility can proceed safely. There shall be a statement in each Operational Readiness Review final report as to whether all identified nonconformances or schedules for gaining compliance with applicable DOE Orders, Secretary of Energy Notices, and Standards/Requirements Identification Documents within the scope of the Operational Readiness Review have been justified in writing, have been formally approved, and in the opinion of the Operational Readiness Review team, maintain adequate protection of the public health and safety, worker safety, and the environment. This conclusion shall be based on:

- 1 Review of the program to document conformance with applicable DOE requirements, including a process to address new requirements; and
- 2 Extensive use of references to DOE requirements in the Operational Readiness Review documentation.

(b) Additionally, there shall be a "Lessons Learned" section of the final report that may relate to design, construction, operation, and decommissioning of similar facilities and to future Operational Readiness Review efforts.

REQUIREMENT SOURCE: DOE C 425.1, Dated 09-29-95, Section 2.b.(11)

Submit Final Report. The final report shall be submitted to the startup/restart authority to be used as a basis to grant approval of the startup or restart of the nuclear facility. A copy of the final shall be provided to EH for review and comment.

1.8 Document and Database Control - Records Management

In the context of this element, the term "document" will be used to include policies, procedures, engineering drawings, databases, and other documents or information requiring control and retention.

REQUIREMENT SOURCE: DOE-O-232.1, Part 4.c.(2)

Retain all supporting information pertaining to each Occurrence Report (e.g., graphs, analyses) in accordance with DOE 1324.5B, RECORDS MANAGEMENT PROGRAM.

1.8.1 Control

REQUIREMENT SOURCE: DOE ORDER 1330.ID, Section 8.g

Each site will have procedures in place which discourage the abuse or misuse of the software operated at the site or any of the data associated with that software. Custom-developed software

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will have safeguards against abuse or misuse identified and incorporated into the software as early in the development process as possible.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 2, Section 2.3.2.3, Paragraph 6

Notification of Pending Changes. Pending changes are those for which conceptual design has been approved and the design change is in process, those changes that have been implemented in the field, but for which the document revision has not been completed. The document control organization should provide notice of pending changes to the persons on the controlled distribution list for the document involved. A notice of the pending change should also be attached to, or appropriately referenced on, the affected master document, in order to alert anyone requesting a copy of the document.

1.8.2 Storage

Requirements for this subelement are shown in subelement 1.8.3.

1.8.3 Retention and Disposal

REQUIREMENT SOURCE: DOE ORDER 1324.5B, Attachment 2

CONTRACTOR REQUIREMENTS

As a minimum requirement, for records maintained under the contract: (1) Adequate and proper documentation shall be created and maintained for all activities carried out under the contract. (2) A records management program shall be established that provides for having all records approved for disposition by the National Archives and Records Administration. This shall be accomplished by having an approved records disposition schedule for every records series maintained.

1.9 Lessons Learned

The Lessons Learned (LL) program interfaces with all functional areas and programs since LL can originate from any source. The 324 building provides identified LL to the site LL coordinator who ensures appropriate distribution.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.7., Sentence 1

In-house events should be evaluated by the operations supervisor to determine if the event should be included in the training program for operations personnel.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VI, Section C.7., Sentence 3

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A mechanism should exist so that appropriate shift personnel could be immediately trained on an event when they next report for work.

REQUIREMENT SOURCE: DOE-O-232.1, Part 4.c.(3)

Collect and disseminate to their personnel the lessons learned from the facility's respective occurrences and the operations information obtained from other similar DOE facilities.

1.10 Key Interfaces

The Management Systems Functional Area is a collection of systems and processes which service all other functional areas. Interfaces with the various Management Systems elements are identified by the other functional areas.

All the other functional areas interface with Management Systems for requirements/standards related to:

- Aspects of functional area management and administration regarding the need for policies and procedures, definition of an organizational structure, staffing, training, and qualification
- Policy and procedure preparation, review, approval, control, and maintenance
- Issue management systems for the identification, evaluation, and prioritization of issues, determination of root causes, and the development, tracking, and completion of appropriate corrective action
- Compliance management processes for the identification and implementation of new and changed requirements/standards
- Management assessments for the evaluation of 324 building activities to determine the degree of compliance with applicable requirements/standards
- Identification, categorization, notification, reporting, investigation, and tracking of occurrences
- Operational readiness reviews and readiness assessments
- Document control systems to ensure current documents are available to and used by 324 building personnel

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- Records storage provisions to ensure records generated at 324 building are available for future reference
- Records disposition measures to ensure records generated at 324 building are retained only until their specified retentions
- Lessons learned processes for the identification and dissemination of information regarding 324 building activities and events to permit continuation of those that are desirable and prevention of those that are not

Specific interfaces between 324 building functional areas are discussed in the sections below.

1.10.1 Quality Assurance

Sub-elements 1.1.1 and 1.1.2 interface with the Quality Assurance Functional Area for requirements/standards related to the need for:

- Procedures, instructions, and other appropriate means to perform work at 324 building
- An organizational structure, functional responsibilities, levels of authority, and interfaces for the managing, performing, and assessing work at 324 building

1.10.2 Configuration Management

Sub-element 1.8.1 interfaces with the Configuration Management Functional Area for requirements/standards related to measures for the protection of master copies of 324 building documents.

1.10.3 Training and Qualification

The Training and Qualification Functional Area for 324 building has no interfaces with Management Systems beyond those discussed above.

1.10.4 Emergency Management

The Emergency Management Functional Area for 324 building has no interfaces with Management Systems beyond those discussed above.

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1.10.5 Safeguards and Security

The Safeguards and Security Functional Area for 324 building has no interface with Management Systems beyond those discussed above.

1.10.6 Engineering

The Engineering Functional Area for 324 building has no interfaces with Management Systems beyond those discussed above.

1.10.7 Operations

Sub-elements 1.1.1 and 1.2.1 interface with the Operations Functional Area for 324 building for requirements/standards related to definition of:

- The need for policies and procedures to support operations at the 324 building
- The general content of policies governing the 324 building activities

1.10.8 Maintenance

The Maintenance Functional Area for 324 building has no interfaces with Management Systems beyond those discussed above.

1.10.9 Radiation Protection

The Radiation Protection Functional Area for 324 building has no interfaces with Management Systems beyond those discussed above.

1.10.10 Fire Protection

The Fire Protection Functional Area for 324 building has no interfaces with Management Systems beyond those discussed above.

1.10.11 Packaging and Transportation

The Packaging and Transportation Functional Area for 324 building has no interfaces with Management Systems beyond those discussed above.

1.10.12 Waste Management

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The Waste Management Functional Area for 324 building has no interfaces with Management Systems beyond those discussed above.

1.10.13 Nuclear Safety

Sub-element 1.2.2 interfaces with the Nuclear Safety Functional Area for 324 building for requirements/standards related to safety evaluations for Unreviewed Questions.

1.10.14 Occupational Safety and Health

The Occupational Safety and Health Functional Area for 324 building has no interfaces with Management Systems beyond those discussed above.

1.10.15 Environmental Protection

The Environmental Protection Functional Area for 324 building has no interfaces with Management Systems beyond those discussed above.

1.11 References

1.11.1 Requirement Source Documents

For references, see attached report titled "RIDs by Document X-Reference Listing".

1.11.2 Reviewed Documents Not Used as Requirement Sources

The following documents were reviewed as requirement sources but were not used in the development of this S/RID:

10 CFR 50 Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants, 3/25/94.

DOE 1300.2A, DOE Technical Standards Program, 5/19/92.

DOE 1360.6A, ADP Equipment/Data Systems, 11/12/92.

DOE 1430.1D, Scientific and Technical Information Management, 6/30/94.

DOE 1430.2B, Scientific and Technical Information Management Program, 2/25/93.

DOE 1430.4A, Library Services, 5/18/92.

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DOE 2300.1B, Audit Resolution and Followup, 6/8/92.

DOE 2320.1C, Cooperation with the Inspector General, 5/18/92.

DOE 2320.2B, Establishment of Departmental Position on Inspector General Reports, 5/18/92.

DOE 3220.1A, Management of Contractor Personnel Policies and Programs, 5/14/92.

DOE 3220.3A, Human Resource Development for M&O Contractors, 5/18/92.

DOE 4320.2A, Capital Assessment Management Process, 2/10/94.

DOE 4330.4B, Maintenance Management Program, 2/10/94.

DOE 4700.1, Project Management System, 3/6/87; Change 1, 6/2/92.

DOE 5000.3B, Occurrence Reporting and Processing of Operations Information, 1/19/93; Change 1, 7/2/93.

DOE 5480.20A, Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities; Change 1, 11/15/94.

DOE 5480.21, Unreviewed Safety Questions, 12/24/91.

DOE 5480.22, Technical Safety Requirements, 2/25/92; Change 1, 9/15/92.

DOE 5480.23, Nuclear Safety Analysis Reports, 4/03/92; Change 1, 3/10/94.

DOE 5480.31, Startup and Restart of Nuclear Facilities, 9/15/93.

DOE 5482.1B, Environmental, Safety, and Health Appraisal Program, 9/23/86; Change 1, 11/18/91.

DOE 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements, 2/24/81; Change 7, 10/17/90.

DOE 5500.1B, Emergency Management System, 4/30/91; Change 1, 2/27/92.

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DOE 5500.2B, Emergency Categories, Classes, and Notification and Reporting Requirements, 4/30/91; Change 1, 2/27/92.

DOE 5500.3A, Planning and Preparedness for Operational Emergencies, 4/30/91; Change 1, 2/27/92.

DOE 5632.5, Physical Protection of Classified Matter, 12/3/88; Change 1, 7/30/93.

DOE 5635.1A, Control of Classified Documents and Information, 2/12/88.

DOE 5639.1, Information Security Program, 10/19/92.

DOE 5650.2B, Identification of Classified Information, 12/31/90; Change 2, 4/28/93.

DOE 5650.3A, Identification of Unclassified Controlled Nuclear Information, 6/8/92.

DOE/EH 0135, Criteria for Technical Safety Appraisals, 4/90.

DOE-STD-3006-93, Planning and Conduct of Operational Readiness Reviews, 11/93.

DOE NE/SP-000IT, Writer's Guide for Technical Procedures, 9/91.

DOE-SAGD, Self Assessment Guidance Document, 12/92.

RL 5482.1B, ES&H QA Appraisal and Surveillance Program, 3/4/87.

NUREG-0899, Guidelines for Preparation of Emergency Operating Procedures, 8/82.

ASME-NQA-1-1994, Quality Assurance Program Requirements for Nuclear Facility Applications, 1994.

BMP-86-024, Software Controls for Plant Computers, 12/91.

BMP-85-026, Writing Guidelines for Maintenance, Test, and Calibration Procedures, 6/85.

BMP-90-015, Performance Objectives and Criteria for Operating and Near Term Operating License Plants, 8/90.

RIDs by Document X-Reference Listing
Based on 324-MS-SD RID and including all documents.

10 CFR 830, Nuclear Safety Management, Dated 04-05-94

DOE C 425.1, Startup and Restart of Nuclear Facilities - Attachment 1 to DOE-O-425.1 Contractor Requirements Document, Dated 09-29-95

DOE ORDER 1324.5B, Records Management Program

DOE ORDER 1330.1D, Computer Software Management

DOE ORDER 4330.4B, Maintenance Management Program

DOE ORDER 5480.19, Conduct of Operations Requirements for DOE Facilities, Revision C01

DOE ORDER 5480.26, Trending and Analysis of Operations Information Using Performance Indicators

DOE ORDER 5480.29, Employee Concerns Management System

DOE ORDER 5482.1B, Environmental, Safety, and Health Appraisal Program, Revision C01

DOE-O-232.1, Occurrence Reporting and Processing of Operations Information

DOE-STD-1073-93, Guide for Operational Configuration Management Program

RLID 425.1, Startup and Restart of Facilities

***** End of RIDs by Document X-Reference Listing *****

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QUALITY ASSURANCE**

2.0 Quality Assurance

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract level S/RID.

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For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

The definition of a Quality Assurance Program, as specified by this document, is intended to address Defense Nuclear Facilities Safety Board Recommendation 90-2, which calls for the strengthening of DOE defense nuclear facility activities through the identification and application of relevant regulations and standards that supplement or exceed requirements mandated by DOE Orders. The 324 Building is considered a nuclear facility, therefore, requirements included are citations directly extracted from 10 CFR 830.120, "Quality Assurance Requirements."

The Quality Assurance Program is outlined in this document in general accordance with the Environment, Safety, and Health Configuration Guide, Revision 0, dated July 30, 1993, and is presented in program elements. The specific 10 CFR 830.120 requirement that serves as the basis for each element is identified and aligned accordingly.

The Site QA Functional Area Document addresses QA requirements which are implemented at a site-wide level. These site-wide QA requirements apply to Management and Administration of the FDH QA Program, Standards Laboratory control of Measurement and Test Equipment (M&TE), independent assessment, and corrective action activities.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the

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Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

2.1 Management and Administration

Author's Note: The requirements for Management and Administration of the FDH QA Program are included in the Contract level Quality Assurance Functional Area Document for implementation.

2.2 Quality Assurance Program

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(1)(i)

Program. A written QAP shall be developed, implemented, and maintained. The QAP shall describe the organizational structure, functional responsibilities, levels of authority, and interfaces for those managing, performing, and assessing the work. The QAP shall describe management processes, including planning, scheduling, and resource considerations.

2.3 Training and Qualification

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(1)(ii)

Personnel Training and Qualification. Personnel shall be trained and qualified to ensure they are capable of performing their assigned work. Personnel shall be provided continuing training to ensure that job proficiency is maintained.

2.4 Quality Improvement

Author's Note: The FDH corrective action management system (CAMS) is implemented at the Contract level and requires use by the facilities.

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(1)(iii)

Quality Improvement. Processes to detect and prevent quality problems shall be established and implemented. Items, services, and processes that do not meet established requirements shall be identified, controlled, and corrected according to the importance of the problem and the work affected. Correction shall include identifying the causes of problems and working to prevent

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recurrence. Item characteristics, process implementation, and other quality-related information shall be reviewed and the data analyzed to identify items, services, and processes needing improvement.

2.5 Documents and Records

Author's Note: The document control and records storage and retrieval processes have been deferred to the 324 building Management Systems Functional Area Document.

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(1)(iv)

Documents and Records. Documents shall be prepared, reviewed, approved, issued, used, and revised to prescribe processes, specify requirements, or establish design. Records shall be specified, prepared, reviewed, approved, and maintained.

2.6 Work Processes

Author's Note: As discussed in the ES&H Configuration Guide, requirements for monitoring, surveillance, and inspection activities which, upon implementation, prevent, detect, and mitigate the release of harmful materials into the environment by providing for the collection, preparation, analysis, validation, verification, and documentation of environmental data are addressed in the 324 building Environmental Protection (EP) Functional Area Document. Specifically, requirements have been extracted from the following source documents and included in Element 20.3 (Environmental Monitoring, Surveillance, and Inspections) of the 324 building EP Functional Area Document:

- WAC 246-247 (Section 075), "Radioactive Air Emissions"
- 40 CFR 61 (Subpart 93), "National Emission Standards for Hazardous Air Pollutants (NESHAPS)"
- TPA (Attachment 2, Section 6.5), "Hanford Federal Facility Agreement and Consent Order [Tri-Party Agreement (TPA)]"

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(2)(i)

Work Processes. Work shall be performed to established technical standards and administrative controls using approved instructions, procedures, or other appropriate means. Items shall be identified and controlled to ensure their proper use. Items shall be maintained to prevent their damage, loss, or deterioration. Equipment used for process monitoring or data collection shall be calibrated and maintained.

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2.7 Design

Author's Note: Specific requirements for design have been deferred to the 324 building Engineering Program Functional Area Document.

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(2)(ii)

Design. Items and processes shall be designed using sound engineering/scientific principles and appropriate standards. Design work, including changes, shall incorporate applicable requirements and design bases. Design interfaces shall be identified and controlled. The adequacy of design products shall be verified or validated by individuals or groups other than those who performed the work. Verification and validation work shall be completed before approval and implementation of the design.

2.8 Procurement

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(2)(iii)

Procurement. Procured items and services shall meet established requirements and perform as specified. Prospective suppliers shall be evaluated and selected on the basis of specified criteria. Processes to ensure that approved suppliers continue to provide acceptable items and services shall be established and implemented.

2.9 Inspection and Acceptance Testing

Author's Note: Calibration requirements for the Standards Lab control of Measurement and Test Equipment (M&TE) are addressed in the Contract level QA Functional Area Document.

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(2)(iv)

Inspection and Acceptance Testing. Inspection and testing of specified items, services, and processes shall be conducted using established acceptance and performance criteria. Equipment used for inspections and tests shall be calibrated and maintained.

2.10 Management Assessment

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(3)(i)

Management Assessment. Managers shall assess their management processes. Problems that hinder the organization from achieving its objectives shall be identified and corrected.

2.11 Independent Assessment

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Author's Note: The area of audits and assessments is a major interface with all organizations in the dissemination of audit and assessment results and follow-up and closure of audit findings and assessment deficiencies or recommendations. Requirements for this element are addressed in the Contract-level QA Functional Area Document. The 324 building is committed to having independent assessments conducted in accordance with the Contract level QA Functional Area Document.

2.12 Key Interfaces

2.12.1 Training and Qualification

The QA Functional Area includes the requirement that personnel shall be trained and qualified to ensure they are capable to perform their assigned work. The Training and Qualification Functional Area addresses, in detail, the general and specialized training requirements which are necessary to satisfy the QA requirement.

2.12.2 Management Systems

Requirements for Tracking and Trending Analysis of identified QA issues are addressed in the 324 building Management Systems Functional Area Document. Document Control and records management processes established in the 324 building Management Systems Functional Area Document apply to QA records.

2.12.3 Construction

The 324 building Construction Functional Area Document incorporates QA requirements for construction program controls which are imposed by incorporation of appropriate quality assurance clauses in construction management and construction contracts, and implemented through procedures and instructions.

2.12.4 Maintenance

The 324 building QA Functional Area Document specifies oversight and inspection requirements. The 324 building Maintenance Functional Area has incorporated into its processes controls for ensuring inspections are complete, quality problems are detected and prevented, and quality improvement measures are imposed.

2.12.5 Engineering Program

The 324 building Engineering Program Functional Area Document has incorporated QA

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requirements to ensure that appropriate controls are imposed for design processes and related activities.

2.12.6 Environmental Protection

The QA Functional Area addresses control of work processes which would include requirements pertaining to monitoring, surveillance, and testing activities. Per the ES&H Configuration Guide, the 324 building EP Functional Area Document discusses these activities and has included QA requirements that provide programmatic controls and describe methods of implementation.

2.13 References

2.13.1 Requirement Source Documents

For references, see attached report titled "RIDs by Document X-Reference Listing".

2.13.2 Reviewed Documents Not Used as Requirement Sources

The following documents were reviewed but were not used in the development of this Functional Area Document:

10 CFR 50 Appendix A, General Design Criteria for Nuclear Power Plants

10 CFR 50 Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Processing Plants

40 CFR 61, "National Emission Standards for Hazardous Air Pollutants (NESHAPS), EPA, Amendments as of 07/01/94

DOE Order 4700.1, Project Management System, 06/22/92

DOE Order 5700.6C, Quality Assurance, 08/21/91

DOE/RW/0333P, QA Requirements and Description for the Civilian Radioactive Waste Management Program, 12/18/92

ANSI/ASME N45.2-1977, Quality Assurance Program Requirements for Nuclear Facilities

ASME-NQA-1-1994, Quality Assurance Requirements for Nuclear Facility Applications

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ASME-NQA-3-1989, Quality Assurance Program Requirements for the Collection of Scientific and Technological Information for Site Characterization of High-Level Nuclear Waste Repositories

International Organization for Standardization (ISO) 9000, Quality Management and Quality Assurance Standards-Guidelines for Selection and Use

International Organization for Standardization (ISO) 9004-1987, Quality Management and Quality System Elements-Guidelines

International Atomic Energy Agency (IAEA) International Nuclear Safety Advisory Group's Safety Series No. 75-INSAG-3, Basic Safety Principles for Nuclear Power Plants Use

U.S. EPA, Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans (QAMS-005/80), 12/29/80

NUREG 1293 Rev. 1, Quality Assurance Guidance for a Low-Level Radioactive Waste Disposal Facility

"DRAFT" ANSI/ASQC E4-19xx, Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs, Draft 09/91

WAC 246-247, "Radioactive Air Emissions," DOH Amendment as of 01/31/94

SNT-TC-1A, American Society for Nondestructive Testing, 1984 Edition

TPA, "Hanford Federal Facility Agreement and Consent Order [Tri-Party Agreement (TPA)]," 07/95

RIDs by Document X-Reference Listing
Based on 324-QA-SD RID and including all documents.

10 CFR 830, Nuclear Safety Management, Dated 04-05-94

***** End of RIDs by Document X-Reference Listing *****

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3.0 Configuration Management

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements, applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are

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satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract S/RID. For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

The Configuration Management (CM) Standards/Requirements Identification Document (S/RID) delineates CM as a basic facility life-cycle function. CM is a management discipline devoted to applying best practices to: (1) identify and document the functional and physical characteristics of a configuration product, (2) control changes to those characteristics, and (3) record and report change processing and implementation status. The Configuration Management product encompasses structures, systems, and components (SSC's), Hardware, software, processes, material and services.

Elements of CM are essential in the ongoing adherence to the authorization basis. Criminal, as well as civil, sanctions are authorized for violations under the Price-Anderson Amendments Act (PAAA) for violations of mandatory regulations, rules, codes, and orders relating to nuclear safety. Other drivers for the importance of the CM process are: (1) the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement), and (2) the Heart of America Settlement Agreement, both of which are legally binding documents.

Configuration Management (CM) application must be tailored, using a graded approach, to be consistent with size, scope, stage of the program's/product's life cycle, nature and complexity of the programs/products involved. When the CM requirements have been properly tailored (graded) to the complexity and life cycle phase of the particular programs/products to be managed, the following can be expected:

1. Maximum latitude during design life cycle and timely configuration control for operation and program/product support purposes.
2. Early and accurate definition of product documentation and tracking of the physical and functional characteristics of the program/project.
3. Availability of verified technical data on time, throughout the life cycle of the program/product, and for the purpose needed.
4. Quicker approval and implementation of proposed engineering changes, waivers, and deviations.
5. Increased operational effectiveness, safety, and program/product support at reduced

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total cost.

6. Significant reduction in the number and variety of documents, forms, databases, and reports for managing the program's/product's configuration.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

Based on activities contained in DOE Standard, DOE-STD-1073-93, "Guide for Operational Configuration Management Program," document requirements conforming to the seven basic program elements contained in the standard are addressed:

- Program management (DOE-STD-1073-93, paragraph 1.3.1)
- Design requirements (DOE-STD-1073-93, paragraph 1.3.2)
- Document control (DOE-STD-1073-93, paragraph 1.3.3)
- Change control (DOE-STD-1073-93, paragraph 1.3.4)
- Assessments (DOE-STD-1073-93, paragraph 1.3.5)
- Design reconstitution (DOE-STD-1073-93, paragraph 1.3.6)
- Material condition and aging management (DOE-STD-1073-93, paragraph 1.3.7).

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An important eighth element is based on DOE Order 5480.19, "Conduct of Operations Requirements for DOE Facilities."

The framework for the Configuration Management functional area is provided by restated requirements from DOE Order 4330.4B. These requirements are referenced as Best Management Practices (BMP) since the order has been altered to apply to Configuration Management.

The essential tasks, actions, or activities that must be accomplished by each element are directly traceable to the paragraph within the standard and/or the DOE Orders. A brief excerpt relating to the function is included to facilitate the identification of FDH implementing requirements.

3.1 Requirements

REQUIREMENT SOURCE: BMP DOE ORDER 4330.4B, Preamble, Section 10

1. For each DOE nuclear facility, the configuration management program shall be described in a Configuration Management Implementation Plan (CMIP), which addresses the eight program elements.
2. For those DOE nuclear facilities where the adjunct Configuration Management program elements of Design Reconstitution and Material Condition and Aging Management are determined to be not necessary and appropriate (or not applicable), such consideration shall be identified in the CMIP with supporting rationale.
3. CMIPs for nuclear facilities shall be submitted to DOE for approval. Changes to CMIP shall be submitted and approved prior to implementation.
4. CMIPs shall follow the Department of Energy (DOE) Technical Standard DOE-STD-1082-94.

3.2 Program Management

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.1

The objective of the program management element is to direct and monitor the development and implementation of the overall CM program.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.1.1, Paragraph c

Development of the CM program plan, based on the graded approach and initial assessments, that

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defines the appropriate level of implementation for the specific facilities, describes those actions already taken to develop and implement the CM program, and identifies the schedules and costs associated with those actions. This plan should address each of the following topics: scope of the structures, systems, and components (SSC's) to be included in the CM program; objectives of each program activity; description of each program activity; basis for the technical content of each program activity; organizational structure and staffing; interfaces; implementation priorities; milestone deliverables, and implementation schedules; and cost estimates. The CM program plan for the basic CM program elements should be provided for DOE review within 18 months after program planning is initiated. The DR and MCA adjunct program plans may be provided separately from the CM program plan, but they should be provided within an additional 6 months after the CM program plan is provided, and they should be incorporated as a part the CM program plan.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.1.2

The types of equipment to be included in the CM program should be identified. The equipment scope of the CM program should be based on the functions provided by the SSCs and should include those SSCs involving safety design requirements (those necessary to protect off-site personnel, on-site personnel, and facility workers from nuclear and other hazards), environmental design requirements (those necessary to protect the environment from significant damage or to satisfy environmental requirements or permits), and mission design requirements (those necessary to avoid substantial interruptions of the programmatic mission or severe cost impacts).

Specific criteria for design requirement types should be developed on the basis of input from the design authority. These design requirement types should encompass safety, environmental, and mission design requirements, and any other types deemed necessary.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.1.4

Configuration Management programmatic and organization interfaces should be identified and interface controls established. Appropriate interfaces should be established within the CM Program (i.e., among the CM elements and functions) and between the CM program and other programs that have configuration management functions. Appropriate organizational interfaces should be established, both internal and external to the contractor organization, and should include policy and criteria for the control of vendor activities and information. Interface controls should include clear assignments of key roles and responsibilities.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.1.5

Databases for use in the identification, storage, control and retrieval of information important to configuration management should be established, and policy and criteria for their use should be defined.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.1.6

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After DOE review of the CM program plan, action plans and specific CM implementation procedures consistent with the action plans should be developed. In addition, governing procedures that correlate the implementing procedures with the CM program plan should be developed and maintained. The CM program should include training on CM concepts, terminology, definitions, and procedures.

3.3 Design Requirements

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.2

The objective of the design requirements element is to establish and maintain the design requirements and the associated design basis.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.2.1

The design requirements should be formally established, documented, and maintained.

- a. For each SSC, the design requirements should be categorized into the types established by the equipment scope criteria (see criterion 1.3.1.2).
- b. A technical review should be performed to determine the adequacy of the design requirements. (The SAR upgrade program may provide useful information here.) If the design requirements are not fully documented, not accurate, or not complete, the design requirements should be reconstituted to the extent identified by the design reconstitution adjunct program.
- c. The design requirements should be incorporated into an equipment database that correlates each SSC with the SSC grade, the design requirements, technical topics involved, and associated documentation.
- d. The design requirements for new facilities and modifications to existing facilities should be established, categorized, and documented as they are developed, in a form amenable to review and addition to the equipment database.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.2.2

The boundaries for each system and process should be established in such a manner as to contain the components necessary to satisfy the design requirements for that system or process.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.2.3

Each SSC should be assigned a grade based on the most important type of design requirements applicable to it. The SSC grade should be used as the basis for the degree of control on all activities associated with the SSC.

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REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.2.4

On the basis of the equipment scope criteria and the assignment of SSC grades, the specific SSCs included in the CM program should be identified.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.2.5

The basis for design requirements should be formally established, correlated with the design requirements, documented, and maintained.

- a. A technical management review should be performed to determine the adequacy of the design basis. If the design basis is not fully documented, not accurate, or not complete, it should be reconstituted to the extent identified by the design reconstitution adjunct program.
- b. The design basis for new or modified design requirements should be established and documented as these requirements are developed.

3.4 Document Control

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.3

The objective of the document control element is to identify and maintain documents within the CM program consistent with the physical configuration and design requirements.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.3.1

The types of documents that need to be included in the CM program should be determined, and document owners should be established for each of these document types. The document owners should be responsible for the technical content of assigned documents. Within each document type, the specific documents to be included in CM document control should be identified for each SSC. The document owners should establish priorities for document revision and retrieval.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.3.2

Originals or master copies of documents within the CM program should be stored and protected. Retention times should be established to meet the needs of the document owners and users and the minimums specified by DOE 1324.2A, Records Disposition.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.3.3

Only the currently-approved revisions of documents within the CM program should be used. Revisions to documents within the CM program to incorporate pending changes should be completed in a timely manner. The number of unincorporated document changes allowed to

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accumulate before revisions are implemented should be determined according to the priority of the document, the complexity of the changes and the overlap of the changes. For each document within the CM program, the following information should be readily available: revision level, current status, document owner, information regarding pending changes, and other data necessary for control and tracking, such as storage location and outstanding document change notices (DCNs).

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.3.4

Documents should be retrieved in a timely manner upon request. Maximum retrieval times for each document should be established, and they should be based on the priorities established by the document owners. Documents should be identifiable from a document database, which should be able to identify documents within the CM program related to particular SSCs, types of SSCs, technical topics, and other information to support identification, such as SSC vendors. When a copy of a document within the CM program is issued, pending changes and associated information should be identified.

3.5 Change Control

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.4

The objective of the change control element is to maintain consistency among the design requirements, the physical configuration, and the facility documentation as changes are made.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.4.1

All mechanisms that can lead to temporary or permanent changes in the design requirements, facility configuration, or facility documentation within the CM program should be identified. Such mechanisms might include hardware modifications not controlled as projects, hardware modifications controlled as projects, maintenance changes, operational changes, procurement changes, document changes, and computer software changes. Change mechanisms should be evaluated to determine which are adequate as is, and which need to be improved, consolidated, or terminated. The resulting change mechanisms should be integrated with the CM program. Within approved CM change mechanisms, each proposed change, including temporary changes and partially implemented changes, should be described sufficiently to support technical reviews, management reviews, and approvals.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.4.2

Each specific proposed change should be reviewed to determine if it is within the bounds of the design requirements. Changes to the design requirements should be evaluated and approved by design authority prior to implementation. The technical reviews should evaluate safety, environmental, and mission impacts; determine appropriate post-implementation acceptance criteria; and identify the affected SSCs and facility documentation.

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REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.4.3

Before implementation, management should review proposed changes (including those that do not involve a change to design requirements) to verify that the technical reviews have been performed adequately, that the change package is complete and ready for implementation, and that any external approvals necessary prior to implementation have been obtained. On the basis of these reviews, management should take approval action.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.4.4

Each change should be implemented in accordance with its approved change package. The change process should include mechanisms for field change requests, and technical reviews and approvals of field changes should be commensurate with those of the original change package. The change process should generate accurate as-built information. After the physical implementation of changes, post-modification testing should be conducted (see criterion 1.3.5.4).

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.4.5

Each change should be documented and that documentation should include a description of the change, as well as an account of the technical reviews, management approvals, as-built information, and post-modification test results. Documents that are included in the CM program and are affected by a change, either directly or indirectly, should be revised.

3.6 Assessments

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.5

The objective of the assessments element is to help define facility configuration management needs and to measure how effective the CM program is in establishing and maintaining the program's basic relationships. Configuration management assessments are conducted in an initial phase, in a post-implementation phase, and throughout the life of the facility.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.5.1, Paragraph a

Initial assessments. During the planning for the CM program, initial assessments should be conducted to determine the strengths and weaknesses of existing programs and procedures with regard to determining where upgrade actions and resource investments are necessary. Two vertical slice assessments relevant to the facility should be conducted. One of these should be on a safety system related to the principal facility hazard, either nuclear or non-nuclear. Two horizontal slice assessments relevant to the facility should also be performed. One of these should be on change control and the other on a technical topical area, such as seismic qualification or fire protection.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.5.1, Paragraph b

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Post-implementation assessments. After the CM program upgrades are implemented, a horizontal slice assessment should be performed for each CM program element to determine if that element addresses identified weaknesses and is effective in accomplishing the CM functions. For each system design information summary (DIS) developed by the DR adjunct program, a field validation should be performed to ensure that the design requirements are accurately reflected in the physical configuration and the associated facility documentation. After the MCA adjunct program is developed, a technical quality review should be performed of its assumptions, methods, and products.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.5.1, Paragraph c

Periodic effectiveness assessments. After the CM program and its adjunct programs have been implemented, a combination of vertical and horizontal slice assessments should be performed periodically to measure the overall CM program effectiveness and to determine if CM controls are adequate and appropriate. The results of these assessments should establish the basis for revisions to the CM program plan, either increasing or decreasing controls.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.5.2

Physical configuration assessments, or walkdowns, should be performed for representative sample SSCs to determine the degree of agreement between the physical configuration and the configuration depicted in the facility documentation. Physical walkdowns should be included as part of the programmatic assessments conducted during the initial assessments, post-implementation assessments, and periodic effectiveness assessments. If substantive discrepancies (either in number or type) are discovered, appropriate immediate corrective actions should be developed to establish agreement between the physical configuration and the documentation. The corrective actions should include additional walkdowns to characterize the problem and to determine the extent of the problem. They should also include technical evaluations to determine whether the physical configuration or the documentation should be changed.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.5.3

Structures, systems, and components within the CM program should be tested periodically to determine if they are still capable of meeting their design requirements. This monitoring should also address surveillance actions, periodic in-service inspections and tests, and other monitoring of SSCs to ensure safe and reliable operation of the facility. Monitoring should also include measurements and trending of data related to the actual aging degradation of equipment, to the extent identified by the MCA adjunct program and approved by the design authority.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.5.4

An SSC within the CM program should be tested after modification (and before being turned over for service) to determine if it is capable of meeting its design requirements (i.e., the

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post-implementation acceptance criteria). If a changed SSC fails to meet its post-implementation acceptance criteria, turnover for operation should be postponed until either a technical review has been completed and any follow-up actions are completed or until the SSC is returned to its original condition and tested satisfactorily.

3.7 Design Reconstitution

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.6

The objective of the DR adjunct program is to establish, organize, and document design information (i.e., both design requirements and design basis), where existing design information is not adequate.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.6.1

A program plan, an action plan, and implementing procedures should be developed for the DR adjunct program. The DR program plan should be based on the initial assessments and the graded approach. The DR adjunct program should be implemented in stages to provide a timely initial set of design information and more information as it becomes available. It should include prioritization of the development and issuance of DISs. Design information summaries for systems or technical topics necessary to support the facility accident analysis and TSRs should receive the highest priority. The DR program plan should address the same topics identified for the CM program plan (described in criterion 1.3.1.1.c).

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.6.2, Paragraph a

Identification and Retrieval of Source Documents. The objective and scope of source documents to be reviewed should be defined for each document identification and retrieval stage. The recommended stages are the formal review, the smart search, and the comprehensive search. The formal review should address those on-hand documents, such as the facility safety analysis and TSRs, that contain summary-type design information; the smart search should identify and retrieve those types of documents that can be identified as most likely to contain design requirements; and the comprehensive search should identify and retrieve any remaining documents that might contain design information, including DOE correspondence and vendor correspondence.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.6.2, Paragraph b

Extraction of Design Information. Technical review and identification of design information from each source document should include both design requirements and design basis information. Extracted design information should be identified as to the applicable facility SSC, type of SSC, technical topic area, and whether it is a design requirement or design basis. The technical review and identification of design information from each source document should be complete, such that the document does not have to be reconsidered during subsequent searches and reviews.

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REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.6.3

Extracted design information should be verified by a second party to ensure that the design information was extracted completely and accurately from the source documents. Extracted design information should be technically validated to ensure that it is reasonable, that it is applicable to the current facility mission and configuration, and that the analytical methods and technical assumptions used in the design process are valid and appropriate. Design basis information should be correlated with the design requirements. Extracted design information should also be evaluated to identify any missing design requirements or design basis information. Design Information Summaries should be field validated to ensure that design requirements are properly reflected in the physical configuration and in the associated facility documentation.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.6.5

Missing design information should be evaluated to determine which part needs to be regenerated. Missing design information that is critical, including that necessary to support the facility accident analysis and TSRs, should be regenerated in order of priority.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.6.6, Paragraph 1

Extracted design requirements should be entered into the CM equipment database promptly after verification and technical validation. Design information summaries should include a system description (including systems interface information), system operability requirements, system-level design requirements, component-level design requirements, the design basis, and related design topical information. They also should identify design requirements by type; attributes of the design that were not mandatory for the designer should be distinguished from other types of design requirements. The authorization basis should be clearly distinguished from other aspects of the design basis. The DISs should be written for easy use by individuals at all levels of experience.

3.8 Material Condition and Aging Management

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.7

The objective of the MCA adjunct program is to prevent the failure of facility life-limiting components from aging degradation and the associated impact on facility operations. Aging degradation can so impair the performance capability of equipment that it no longer meets its design requirements, and this can compromise the CM program basic relationships.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.7.1

A program plan, an action plan, and implementing procedures should be developed for the MCA adjunct program. The program plan should be based on the initial assessments and the graded approach. The program plan should address the same topics identified for the CM program plan (described in criterion 1.3.1.1.c).

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REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.7.2

Components in the facility, including passive components (e.g., structures), should be screened to identify those that are potentially life-limiting for the facility.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.7.3

The remaining lifetime for each potentially life-limiting component should be evaluated. Major aging degrading mechanisms that could affect potentially life-limiting components should be identified. The present material condition of each such component should be determined.

3.9 Equipment and System Status Control

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter VIII, Section B., Paragraph 3

Control over equipment and system status should be established in accordance with a formal guidance to ensure that proper configuration is maintained. This guidance should include instructions for system alignments, locking of components, verification of technical specification compliance prior to plant operating-mode changes, authorization prior to removing or restoring equipment to service, and identification and documentation of equipment deficiencies.

3.10 Key Interfaces

CM is involved with ensuring that the technical documentation, that is, documentation by which a product is identified, controlled and recorded and conforms with contractual requirements and the technical integrity, is maintained during the product's life cycle. Because the other S/RID Functional Areas provide input to and work with the technical documentation, it is essential that interactions between CM and the other Functional Areas be effectively related and understood.

3.10.1 Management Systems

Essential key interfacing configuration management elements in the Management Systems Functional Area include: Document Control/Records Management, Compliance Management, Occurrence Reporting, Readiness Reviews, and the Work Breakdown Structure per 10 CFR 830, DOE 425.1 and DOE 1324.5B.

CM policies and procedures and supporting requirements for Document Control Records Management are elements of the Management Systems Functional Area. Management Systems provides the necessary infrastructure and ensures that positive administrative

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controls are in place to support CM Program development, implementation, and maintenance. CM policies and procedures must be developed and promulgated by management in accordance with requirements identified in the Management Systems Functional Area.

3.10.2 Engineering Program

The Engineering Program Functional Area should provide for the establishment and maintenance of the engineering related technical requirements and should include technical review of changes within the scope of the CM Program per 10 CFR 830 and DOE 6430.1A.

The design process is established in accordance with requirements specified in the Engineering Program Functional Area. The CM Program must effectively control the data and information that is used as design input and created as design output by the Engineering Program function.

3.10.3 Operations

Operational activities can contribute to inadvertent and undocumented changes that may deviate from the established technical baseline. The Operations Functional Area should provide requirements to ensure that the proper technical reviews to guard against these kinds of changes are conducted. Facility systems status tracking is performed according to DOE 5480.19 and is included in the Operations Functional Area.

The CM Program ensures the adequacy, accuracy, and currency of the drawings, procedures, and data/information used to operate the facility. The technical requirements identified and controlled by the CM Program are used by procedure developers and operators to control equipment and systems within safe operating envelopes. Changes to either the design or the equipment installed are translated to effective operations via the CM process.

3.10.4 Maintenance

Maintenance activities contribute significantly to changes in the configuration, and the Maintenance Functional Area should provide for requirements and technical reviews to guard against inadvertent configuration changes per DOE 4330.4B.

The interface between the Maintenance functional element and CM include the provision of as-built drawings, vendor documentation and design data, and information to support

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conduct of maintenance/work activities and maintenance procedure development. Maintenance activities can also contribute to configuration changes in the accomplishment of work (spare part replacements and minor modifications).

3.10.5 Nuclear Safety

The Nuclear Safety Functional Area should include the appropriate safety requirements which are included in the technical baseline which forms the foundation of the CM Program and that technical reviews conducted on changes incorporate the needed nuclear safety attributes per DOE 5480.21, .22 and .23.

The CM Program helps ensure that the information used for Nuclear Safety analyses is accurate, complete, and up-to-date. The CM process should ensure that the impact of design and facility changes will be identified and addressed to ensure that the SSCs are operated and maintained within the maximum safe limits.

3.10.6 Training and Qualification

The CM Functional Area interfaces with training to provide necessary awareness, communicate expectations, and ensure effective implementation of the elements and functions of the CM program per DOE 5480.20A.

3.10.7 Quality Assurance

Quality Assurance has a direct interface with Configuration Management Programs by establishing configuration management oversight of configuration management per 10 CFR 830.

3.10.8 Radiation Protection

Activities in the Configuration Management Functional Area must interface to the Radiation Protection (RP) Functional Area to ensure that current radiation protection systems are not compromised by modifications, and that new activities receive the proper review in case new systems are needed as part of routine surveillance/maintenance and/or as part of deactivation activities per 10 CFR 835.

3.10.9 Fire Protection

The Fire Protection Functional Area evaluates fire hazards and identifies design features necessary to mitigate fire hazards. The Configuration Management Functional Area maintains the technical baseline of the installed fire protection systems and related

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equipment, construction services, and temporary modifications to existing and new facilities per DOE 5480.7A.

3.11 References

3.11.1 Requirement Source Documents

For references used in this functional area, see attached report titled "RIDs by Document X-Reference Listing".

3.11.2 Reviewed Documents Not Used as Requirement Sources

The following documents were reviewed as requirement sources but were not used in the development of this Functional Area:

DOE 4330.4B, Maintenance Management Program, February 10, 1994.

DOE 4700.1, Project Management System, Change 1, June 2, 1992.

DOE 5700.6C, Quality Assurance, August 21, 1991.

DOE 6430.1A, General Design Criteria, April 6, 1989.

DOE Implementation Guide for 10 CFR 830.120, 08/94

DOE-STD-1082-94 DOE Standard, Preparation Review and Approval of Implementation Plans for Nuclear Safety Requirements, October 1994.

DOE/EH0135, Criteria for Technical Safety Appraisal, June 1990.

EIA/IS-649, Electronic Industries Association-Interim Standard-National Consensus Standard for Configuration Management, August 1995.

BMP 87-006, Report on Configuration Management in the Nuclear Industry, July 1987.

ASME-NQA-1-1994, Quality Assurance Program Requirements for Nuclear Facility Applications, 1994.

RIDs by Document X-Reference Listing

Based on 324-CM-SD RID and including all documents.

BMP DOE ORDER 4330.4B, Maintenance Management Program

DOE ORDER 5480.19, Conduct of Operations Requirements for DOE Facilities, Revision C01

DOE-STD-1073-93, Guide for Operational Configuration Management Program

***** End of RIDs by Document X-Reference Listing *****

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4.0 Training and Qualification

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements, applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The Training and Qualification Program defined in this document is described in general accordance with the Environment, Safety, and Health Configuration Guide, Revision 0, dated July 30, 1993, and is presented in program elements and subelements. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

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This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract S/RID. For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

Several additional subelements have been included in this S/RID that are not specifically identified in the ES&H Configuration Guide. This has been done to improve the readability and usability of the S/RID. Some subelements have been divided in order to allow readers to focus on requirements in logical groups. Additionally, subelements have been added to accommodate the transfer of training related requirements from other functional area S/RIDs, thus allowing all training requirements to be contained in the Training and Qualification S/RID. Subelements added for these reasons include: Program Policy (4.1.1), Training Organization and Staffing and Training (4.1.2), Testing (4.2.8.1), Qualification and Requalification (4.2.8.2), Extension, Exceptions and Alterations (4.2.10), General Employee Training (4.3.1), Lockout and Tagout Training (4.3.1.1), Hazard Communication Training (4.3.1.2), Maintenance Training Program (4.3.2), Management and Supervisory Training (4.3.3), Operator Training (4.3.4), Continuing Training (4.3.5), Technical Support Personnel Training (4.3.6). Subelements 4.6.1 thru 4.6.19 were added to provide further key interface definition. Element 4.7 was added to address document references.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

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Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

4.1 Management and Administration

4.1.1 Program Policy

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(3)(i)

Management Assessment. Managers shall assess their management processes. Problems that hinder the organization from achieving its objectives shall be identified and corrected.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 330(1) and (1)(a)

Training program. The facility owner or operator must provide a program of classroom instruction or on-the-job training for facility personnel. This program must teach personnel to perform their duties in a way that ensures the facility's compliance with this chapter 173-303 WAC, must teach facility personnel dangerous waste management procedures (including contingency plan implementation) relevant to the positions in which they are employed, must ensure that facility personnel are able to respond effectively to emergencies, and must include those elements set forth in the training plan required in subsection (2) of this section. In addition:

(a) The training program must be directed by a person knowledgeable in dangerous waste management procedures, and must include training relevant to the positions in which the facility personnel are employed;

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 330(1)(b)

Facility personnel must participate in an annual review of the training provided in the training program;

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 330(1)(c)

This program must be successfully completed by the facility personnel:

(i) Within six months after these regulations become effective; or

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(ii) Within six months after their employment at or assignment to the facility, or to a new position at the facility, whichever is later.

Employees hired after the effective date of these regulations must be supervised until they complete the training program; and

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 330(1)(d)

At a minimum, the training program must familiarize facility personnel with emergency equipment and systems, and emergency procedures. The program must include other parameters as set forth by the department, but at a minimum must include, where applicable:

- (i) Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment;
- (ii) Key parameters for automatic waste feed cut-off systems;
- (iii) Communications or alarm systems;
- (iv) Response to fires or explosions;
- (v) Response to ground-water contamination incidents; and
- (vi) Shutdown of operations.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 330(2)

Written training plan. The owner or operator must develop a written training plan which must be kept at the facility and which must include the following documents and records:

- (a) For each position related to dangerous waste management at the facility, the job title, the job description, and the name of the employee filling each job. The job description must include the requisite skills, education, other qualifications, and duties for each position;
- (b) A written description of the type and amount of both introductory and continuing training required for each position; and
- (c) Records documenting that facility personnel have received and completed the training required by this section. The department may require, on a case-by-case basis, that training records include employee initials or signature to verify that training was received.

4.1.2 Training Organization Staffing and Training

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 2

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TRAINING ORGANIZATION REQUIREMENTS. The operating contractor shall establish one or more organizations to be responsible for the training of operating organization personnel. This organization(s) shall be held accountable for providing facility line management with the support necessary to ensure that personnel in the operating organization are qualified to safely and effectively meet job requirements. In some cases (e.g. Category B reactors, low-hazard (category 3) non-reactor nuclear facilities, or less complex, small facilities) this function may be integrated into the operating organization and may not necessarily be officially designated as a training organization. The responsibilities, qualifications, and authority of training organization personnel shall be documented, and managerial responsibilities and authority clearly defined. This organization may include subcontracted personnel who conduct training activities. At sites where a central training organization is used, this organization may be separate from the facility operating organization for support in areas of regulatory training. For example, central training organizations that provide support to line operating organizations may conduct training for the operating organization in regulatory compliance issues (e.g., OSHA training, Radiation Worker training, supervisory/management training, etc.) that have site-wide application, and which have content that is defined from other sources.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 3

SUBCONTRACTOR PERSONNEL QUALIFICATION REQUIREMENTS. Subcontractor personnel shall meet the qualification requirements for the job function to be performed. In addition, the operating organization shall ensure that subcontractor and temporary personnel who perform specialized activities (e.g., radiation protection, maintenance, in-service inspection, radiography, and welding) are qualified to perform their assigned tasks. Personnel shall be considered adequately qualified with proper documentation of at least one of the following:

- a. 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, or;
- b. The operating organization's previous verification (within 2 years) of the ability of the subcontractor employee to perform assigned tasks safely and efficiently, or;
- c. 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.

For subcontractor personnel who do not meet the requirements, work activities on engineered safety features as 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 the activities.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 4.a

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The operating contractor shall establish a process for selection and assignment of personnel into the operating organization. This process should consider factors such as background, experience, and education and should be based on the ability of the person to meet job performance requirements. Selection of operating organization personnel may involve a selection test.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 4.b

If an individual does not meet the experience requirements of this Order, consideration may be given to the collective experience of the operating organization. Individuals who do not meet the experience requirements for a position may be assigned to that position provided the overall operating organization is considered balanced and strong and that DOE approval is obtained on a case-by-case basis.

4.2 Administration of Training

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(1)(ii)

Personnel Training and Qualification. Personnel shall be trained and qualified to ensure they are capable of performing their assigned work. Personnel shall be provided continuing training to ensure that job proficiency is maintained.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Preamble, Attachment 1

Author's Note: Items number 4 and 5 do not apply to the 324 Building.

DOE 5480.20A, PERSONNEL SELECTION, QUALIFICATION, AND TRAINING REQUIREMENTS FOR DOE NUCLEAR FACILITIES, of (date), requires that the following requirements be applied to contractors awarded DOE procurement management[sic spelling error] and operating contracts for operable DOE nuclear facilities. Management and operating contractors shall:

1. Implement the requirements of DOE 5480.20A as they apply to the facility and the position;
2. Prepare and submit a Training Implementation Matrix to the Operations Office Manager for review and approval;
3. Prepare and submit procedures which establish the requirements for granting exceptions to specific training or qualification requirements for an individual to the Operations Office Manager for review and approval;
4. Provide written requests for certification extensions to the Operations Office Manager for approval; and
5. Prepare and submit an assessment of the need for a simulator to the Operations Office Manager

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for review and approval (Category A test and research reactors only).

6. Perform periodic systematic evaluations of training and qualification programs.

4.2.1 Selection and Qualification

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7 Introduction, Sentence 1 and 2

TRAINING REQUIREMENTS. Training to support qualification and certification programs shall be based on a systematic approach to training. A graded approach shall be used to establish the systematic approach to training for operations personnel, maintenance personnel, technicians, and the technical staff.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.a.(2)

The training and qualification program for nuclear facilities should be developed on the basis of the hazards involved and risk associated with the operation of the facility or activity. Accordingly, the level of detail of and content of the Training Implementation Matrix and content of the training programs should reflect the training and qualification needs of these facilities to assure personnel are qualified to carry out their assigned responsibilities (i.e., a graded approach should be applied).

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 6, Part 1, Article 616.3

Instructors-in-training shall be monitored by a qualified instructor.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 6, Part 1, Article 616.4

Subject matter experts without instructor qualification may provide training in their areas of expertise. However, these subject matter experts should be trained as instructors when this occurs routinely.

4.2.2 Training Needs Assessment

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.b Introduction, Sentences 1 and 2

Training Process. Initial and continuing training programs shall be established to ensure that operating organization personnel are qualified to perform job requirements. This shall be achieved by using a systematic approach to training.

4.2.3 Design and Development

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.a Introduction

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General. 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. Classroom-type training may include lectures, seminars, computer-based training, and structured self-study activities.

4.2.4 Implementation

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.a.(1)
Introduction

A Training Implementation Matrix which defines and describes the application of the selection, qualification, certification, and training requirements of this Order shall be prepared by the contractor operating organization. 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. Suitable justification for exceptions shall be included in the Matrix for any requirement not implemented. At some sites with several facilities, a combined Training Implementation Matrix may be submitted.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.c, Sentences 1-3

Initial Training Requirements. An initial training program shall be established for operating organization personnel at operable nuclear facilities to develop or enhance their knowledge and skills to perform job assignments. These programs should be structured commensurate with specific position needs. Examinations (written, oral, operational evaluations, performance demonstrations) on material included in the training programs shall be administered and documented as appropriate.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.c, Sentences 4-5

Personnel who are in-training shall not independently make decisions or take actions that could affect facility safety, nor shall personnel who are in-training be placed in such positions. However, they may independently perform specific tasks or job assignments for which they are qualified.

4.2.5 Evaluation

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.a.(3), Sentence 1

Qualification and certification programs shall be reviewed by contractor facility management and shall be kept up to date to reflect changes to the facility, Safety Analysis Reports, Technical Safety Requirements, procedures, regulations, and applicable industry operating experience.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Preamble, Section 6.b

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Evaluations of training and qualification programs shall be conducted using DOE-STD-1070-94.

4.2.6 Facilities and Equipment

DOE 5480.20A Preamble, Section 6.b which is in 4.2.5 of this document contains requirements applicable to this subelement.

4.2.7 Training Schedules

Requirement for this subelement are included within 4.3.5 of this document.

4.2.8 Testing, Qualification, Certification

4.2.8.1 Testing

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 8 Introduction

OPERATOR AND SUPERVISOR EXAMINATION REQUIREMENTS. Comprehensive written and oral examinations and operational evaluations shall be prepared and administered to demonstrate that certified operator and certified supervisor candidates possess the required knowledge and skills. Comprehensive written examinations and individual performance demonstrations shall be administered to ascertain the qualification of other operator and supervisor candidates that include duties that are important to engineered safety features as identified in the Safety Analysis Report. For Category A reactor facility certified personnel, the oral examination shall be separate from the operational evaluation. Operational evaluations and oral examinations may be combined for Category B reactor and non-reactor nuclear facility certified personnel. These examinations shall contain a representative sampling of the knowledge and skills identified in and derived from the learning objectives resulting from the systematic analysis of the position. Examinations should include questions from sources such as Safety Analysis Reports, Technical Safety Requirements, system description manuals, operating procedures, Occurrence Reports, and other applicable sources.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 8.a

Written procedures that establish requirements for examinations shall be developed and implemented. These procedures shall address, at a minimum, examination/evaluation development, approval, security, administration, remediation, and maintenance of examination question banks.

4.2.8.2 Qualification and Requalification

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 5.a

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Operating organizations shall define qualification requirements for personnel in each functional level based on the criteria contained in this Order. The relative importance of managerial and technical competence should be considered by management in establishing these requirements. Specific knowledge and skills differ for each level in the organization. At the higher functional level, managerial competence is the dominant need, whereas technical competence is the dominant need at other functional levels.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 5.c

Technician and maintenance personnel qualification shall include demonstrated performance capabilities (performance demonstrations) to ascertain their ability to adequately perform assigned tasks. Written examinations should also be administered to personnel in these positions. However, a comprehensive final examination need not be administered to ascertain formal qualification of technicians and maintenance personnel (with the exception of radiological control technicians, who shall comply with the requirements of the DOE Radiological Control Manual). Participation in continuing training programs is required to maintain and improve their abilities to continue to function safely in the operating organization. The requirements that are described in Chapter I, paragraph 7d, shall be implemented to the extent to which they apply to the position. Their continued satisfactory performance of assigned duties and their satisfactory participation in the continuing training program (classroom, OJT, laboratory, etc.) serves as sufficient evidence of maintenance of their qualification.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 5.d, Sentences 1 thru 4

Qualification of operators and their immediate supervisors shall include examinations (written, oral, operational evaluations, performance demonstrations) as applicable to the position. Written examinations and performance demonstrations shall be administered to qualified operators and supervisors. Written and oral examinations and operational evaluations shall be administered to certified operators and supervisors. Initial qualification/certification for a position shall include a comprehensive examination to ascertain the person's suitability to perform assigned duties.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 5.d, Sentences 5 thru 7

Participation in the continuing training program described in Chapter I, paragraph 7d shall be required following initial qualification to the extent to which it applies to the position. Upon completion of the continuing training program requalification may be achieved by either administering a comprehensive requalification examination, including any operational evaluations or performance demonstrations that may be specified, or by administering periodic examinations (e.g., quarterly) during the requalification cycle. Whether a comprehensive examination or periodic examinations are administered, after completing the continuing training program, the operating organization shall indicate by signature that the person has successfully completed the requalification program and is formally requalified.

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REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 5.e

Qualification may be granted only after assuring that all requirements (including training and examinations as required) and other specified requirements (e.g., medical examination) have been satisfactorily completed.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 5.f

Qualification of operators and their immediate supervisors in the operating organization is valid for a period not to exceed two years unless revoked for cause (e.g., medical disqualification, performance deficiencies).

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 9

OPERATOR AND SUPERVISOR REEXAMINATION REQUIREMENTS. Reexaminations for certified and qualified operators and supervisors shall include subjects in which the person is expected to be knowledgeable and emphasize those subjects covered by the continuing training program. The contractor shall administer comprehensive biennial examinations, or administer periodic (e.g., quarterly) examinations throughout the continuing training cycle. Written examinations and performance demonstrations shall be administered to qualified operators and supervisors. Written and oral examinations and operational evaluations shall be administered to certified operators and supervisors.

For Category A reactor facility certified personnel, the oral examination shall be separate from the operational evaluation. Operational evaluations and oral examinations may be combined for Category B reactor and non-reactor nuclear facility certified personnel. Written examinations for certified operators and certified supervisors shall include a representative sampling of the topics specified in Chapters II, III, and IV to the extent applicable to the position and the facility. Operational evaluations shall require certified operators and certified supervisors to demonstrate an understanding of and the ability to perform a representative sampling of the control manipulations specified in Chapters II, III, and IV to the extent applicable to the position and the facility.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 10 Introduction

REQUALIFICATION REQUIREMENTS. Operators and their immediate supervisors shall not be allowed to continue to function in qualified or certified positions if they have not completed all of the requalification or recertification program elements within the two year continuing training cycle. The program elements consist of the continuing training program and the associated reexaminations. If a qualified or certified operator or supervisor fails a requalification or recertification 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 or certification.

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REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 10.a

Qualification or certification may be regained after completing remedial training designed to correct the deficiency(s) and satisfactorily completing a reexamination. In addition, recertification shall be based on the following:

- (1) 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; and
- (2) A current medical examination as required by Chapter II paragraph 3, Chapter III paragraph 3, or Chapter IV paragraph 3.

4.2.9 Revision and Update of Training

Requirements applicable to this subelement are included in 4.2, Administration of Training.

4.2.10 Extension, Exceptions and Alterations

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 11.a

The operating organization shall establish an administrative procedure that describes the methods used to administer and document exceptions to initial training program requirements. 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. In all cases, the operating organization shall ensure that sufficient facility-specific instruction is provided to enable the candidate to perform job requirements. The operating organization shall submit the procedure for granting exceptions to the Operations Office Manager for approval.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 12.b

Extensions of certification of operators and supervisors may be approved only by the Operations Office Manager. Extensions of qualification of operators and supervisors may be approved by contractor facility management.

4.3 Training Categories and Subjects

4.3.1 General Employee Training

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 901(a)

All general employees shall be trained in radiation safety prior to receiving occupational exposure during access to controlled areas at a DOE site or facility. Allowance may be made for previous

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DOE training on generic radiation safety topics (i.e., those not specific to a site or facility), provided the training was received at another DOE site or facility within the past 2 years. Documentation of the previous training shall clearly identify the individual's name, date of training, topics covered, and name of the certifying individual. The knowledge of radiation safety possessed by general employees shall be verified by examination.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 901(b)

Retraining shall be provided when there is a significant change to radiation protection policies and procedures that affect general employees and shall be conducted at intervals not to exceed 2 years.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 120(p)(8)(iii)(A)

(iii) Training.

(A) Training for emergency response employees shall be completed before they are called upon to perform in real emergencies. Such training shall include the elements of the emergency response plan, standard operating procedures the employer has established for the job, the personal protective equipment to be worn and procedures for handling emergency incidents.

Exception #1: An employer need not train all employees to the degree specified if the employer divides the work force in a manner such that a sufficient number of employees who have responsibility to control emergencies have the training specified, and all other employees, who may first respond to an emergency incident, have sufficient awareness training to recognize that an emergency response situation exists and that they are instructed in that case to summon the fully trained employees and not attempt control activities for which they are not trained.

Exception #2: An employer need not train all employees to the degree specified if arrangements have been made in advance for an outside fully-trained emergency response team to respond in a reasonable period and all employees, who may come to the incident first, have sufficient awareness training to recognize that an emergency response situation exists and they have been instructed to call the designated outside fully-trained emergency response team for assistance.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 120(p)(8)(iii)(C)

(C) The employer shall certify that each covered employee has attended and successfully completed the training required in paragraph (p)(8)(iii) of this section, or shall certify the employee's competency at least yearly. The method used to demonstrate competency for certification of training shall be recorded and maintained by the employer.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.e Introduction

General Employee Training (GET) Requirements. All persons employed either full- or part-time in DOE nuclear facilities shall be trained commensurate with their job duties

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REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.e.(1)

GET programs shall include training on the following areas as they relate to individual jobs:

- (a) General description of facilities;
- (b) Job related policies, procedures, and instructions;
- (c) Radiological health and safety program;

1 Training program content shall be in accordance with DOE/EH-0256T, Radiological Control Manual, Chapter 6, Training and Qualification.

- (d) Facility emergency plans;
- (e) Industrial safety/hygiene program;
- (f) Fire protection program;
- (g) Security program;
- (h) Quality assurance program; and
- (i) Criticality safety.

1 Training program content shall be in accordance with ANSI/ANS 8.20 - 1991, Criticality Safety Training.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.e.(2)

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. For example, short-term visitors should be given instruction in items (a), (c), (d), (e), and (g), while contracted and temporarily assigned personnel may need training in additional topics as related to their assignments.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.e.(3)

For persons requiring long-term (i.e., more than 1-2 weeks) access, understanding of the information provided by the GET program shall be evaluated by administering a written examination. The examination should cover areas selected for training and should be of sufficient difficulty to ensure the person has adequate knowledge to work independently at the facility. Persons who do not pass this examination shall not be permitted access without a continuous escort.

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REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.e.(4)

Changes in GET areas identified in paragraph 7e(1) shall be included in continuing training programs for all facility personnel. Periodic examinations should be administered on areas of the GET program that are included in the continuing training program.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(11)(b) Introduction

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.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(11)(b)(2)

Annual retraining shall include training on weaknesses detected during drills and exercises, changes to plans, procedures, and lessons learned from emergencies at DOE and other industrial facilities.

4.3.1.1 Lockout and Tagout Training

Author's Note: Additional requirements are included in the FDH Company S/RID.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 147(c)(1)

Energy control program. The employer shall establish a program consisting of energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, start up or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source, and rendered inoperative.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 332(b)(3)

Additional requirements for qualified persons. Qualified persons (i.e., those permitted to work on or near exposed energized parts) shall, at a minimum, be trained in and familiar with the following:

- (i) The skills and techniques necessary to distinguish exposed live parts from other parts of electric

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equipment,

- (ii) The skills and techniques necessary to determine the nominal voltage of exposed live parts, and
- (iii) The clearance distances specified in § 1910.333(c) and the corresponding voltages to which the qualified person will be exposed.

Note 1: for the purpose of §§ 1910.331 through 1910.335, a person must have the training required by paragraph (b)(3) of this section in order to be considered a qualified person.

Note 2: Qualified persons whose work on energized equipment involves either direct contact by means of tools or materials must also have the training needed to meet § 1910.333(c)(2).

4.3.1.2 Hazard Communication Training

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 1200(h) and (h)(1)

Employee information and training.

(1) Employers shall provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new physical or health hazard the employees have not previously been trained about is introduced into their work area. Information and training may be designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical-specific information must always be available through labels and material safety data sheets.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 1200(h)(2)

Information. Employees shall be informed of:

- (i) The requirements of this section;
- (ii) Any operations in their work area where hazardous chemicals are present; and,
- (iii) The location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and material safety data sheets required by this section.

4.3.2 Maintenance Training Program

REQUIREMENT SOURCE: DOE ORDER 4330.4B, Chapter II, Section 3.3.6, Sentence 1

In addition to training in technical maintenance functions as described in the preceding, a select group or team should be schooled in principles and methods of root-cause analysis.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.g.(1)

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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.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.g.(2)

Training on engineered safety features as identified in the facility Safety Analysis Report shall be conducted for personnel who perform work on those systems/components. Included in this category are systems having a direct impact on the safe operation of the facility. Examples of engineered safety feature systems are emergency core cooling systems, instrumentation systems that provide protective functions, emergency electrical power distribution systems, and other systems whose failure could have an adverse affect to the environment or the health and safety of the public. System training shall, at a minimum, include the following elements:

- (a) Purpose of the system;
- (b) General description of the system including major components, relationship to other systems, and all safety implications associated with working on the system; and
- (c) Related industry and facility-specific experience.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter IV, Section 2.d

Technicians. Technicians are principally involved in calibration, inspection, troubleshooting, testing, maintenance, and radiation protection activities at the facility. Examples are laboratory technicians, instrument technicians, and radiological control technicians.

- (1) Experience:
Job related	1 year

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter IV, Section 2.e

Maintenance Personnel. Maintenance personnel are responsible for the maintenance and repair of mechanical and electrical equipment.

- (1) Experience:
Maintenance related	1 year

4.3.3 Management and Supervisory Training

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.i Introduction

Management and Supervisory Training Requirements. The topics listed in paragraph 7h shall be

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considered for applicability when developing manager and supervisor training programs. If training related to those topics is applicable to the position, that training shall be included in addition to the topics listed below, as appropriate to their job responsibilities. Supervisory skills and management training need not be subject to examination as part of initial training, nor is it necessary to include training on these topics in the continuing training program. It may, however, be appropriate to include additional topics such as these as part of the ongoing professional development program for managers and supervisors.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.i.(1)

Supervisory Skills Training. The supervisory skills training program shall include the following (or equivalent):

- (a) Leadership;
- (b) Interpersonal communication;
- (c) Responsibilities and authority;
- (d) Motivation of personnel;
- (e) Problem analysis and decision making;
- (f) Fitness for duty procedures; and
- (g) Administrative policies and procedures.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.i.(2)

Management Training. The management training program should include:

- (a) Supervisory skills training;
- (b) Quality assurance and quality control;
- (c) Facility security and emergency plans;
- (d) Purchasing;
- (e) Material storage;
- (f) Facility modifications (configuration control);
- (g) Nuclear, industrial, and radiation safety;
- (h) Environmental issues; and
- (i) Budgeting.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter IV, Section 2.a

Managers. The term "Manager" refers to a person whose assigned responsibilities include ensuring that a plant or facility is safely and reliably operated, and that supporting operational and administrative activities are properly controlled. Managers are responsible for nuclear safety, operational efficiency and reliability, control of onsite emergencies, and any other activities necessary to safeguard the health and safety of the workforce, the general public, and the environment. Operational responsibilities include prioritizing and assessing facility activities including modifications, and overseeing the operating organization. Administrative responsibilities

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include maintenance of a qualified staff, budgets, maintaining employee performance, administering disciplinary actions consistent with company policies, public information, and coordination with corporate offices. This functional level typically includes the Plant/Facility Manager or Director, the Operations Manager, the Maintenance Manager, the Training Manager, and the Technical Manager. Prior to assuming the duties of the assigned position, persons at the manager level shall meet the following requirements:

(1) Education: Baccalaureate in engineering or related science

(2) Experience:
Nuclear 4 years

(3) Special Requirements:

(a) Education or experience that is job-related may be substituted for a degree on a case-by-case basis. The degree may fulfill 3 of the 4 years of nuclear experience required on a one-for-one time basis;

(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; and

(c) The Training Manager shall have a baccalaureate including courses in education and technical subjects (baccalaureate need not be in engineering or related science).

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter IV, Section 2.b

Supervisors. This functional level consists of those individuals who are responsible for the quantity and quality of work performed and who direct the actions of operators, technicians, or maintenance personnel. Their duties include ensuring that work is performed in compliance with procedures, policies, and industrial safety practices. Prior to assuming the duties of the assigned position, supervisors shall meet the following requirements:

(1) Education: High School Diploma

(2) Experience:
Nuclear 3 years

(3) Special Requirement: Full-time academic training (i.e., degree programs, trade schools, vocational programs, etc.) may be substituted on a one-for-one basis for 2 of the 3 years of required nuclear experience.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 6, Part 5, Article 651

Other Radiological Training

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Management Training

Line Managers (DOE and contractors) who manage, supervise or provide oversight of Radiological Control Programs shall be trained in the principles of this Manual. Such training should be based on DOE standardized core course training materials supplemented by site-specific procedures and be completed by new personnel prior to formally assuming line supervision and management responsibilities. Incumbents should participate in continuing training. The continuing training should emphasize self-assessment and external evaluations including performance indicators, root causes and lessons learned based on operational experience.

4.3.4 Operator Training

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter V, Section C.3., Paragraph 3

When trainees record equipment parameters on official round sheets (as opposed to practice round sheets) or logs, the on-shift instructor should verify that the recorded information is correct. In addition, the trainee and on-shift instructor should discuss any out-of-specification readings and the consequences of allowing such trend to continue.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Chapter X, Section C.3., Sentences 1 and 2

Operators should be trained in the appropriate techniques for verifying the positions of all facility components. In addition, a reference document should be provided explaining what an operator should do when verifying a component position.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter IV, Section 2.c

Operators. Operators are persons responsible for performing operations associated with engineered safety features as identified in the Safety Analysis Report, operating support systems which could affect engineered safety features, or conducting activities with radioactive materials. Duties may include manipulating facility controls, monitoring parameters, and operating equipment in facility safety systems. Operators include fissionable material handlers, tritium facility operators, chemical process operators, waste tank operators, and enrichment facility operators.

(1) Education: High School Diploma

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter IV, Section 4.a

Operators. Operator training shall be sufficiently comprehensive to cover areas which are fundamental to the candidate's assigned tasks to ensure that personnel are capable of safely performing their job duties. The training program shall include the following:

(1) A core of subjects such as industrial safety, instrumentation and control, basic physics,

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chemistry, industry operating experience, and major facility systems, as applicable to the position and the facility.

(2) On-the-job and classroom-type training to ensure that personnel are familiar with all aspects of their positions. Such training shall include but not be limited to:

- (a) Normal and emergency procedures;
- (b) Administrative procedures;
- (c) Radiation control practices;
- (d) Location and functions of pertinent safety systems and equipment;
- (e) Procedures for making changes or alterations in operations and operating procedures; and
- (f) Technical Safety Requirements.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter IV, Section 4.c

Supervisors. 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. This training shall be of increased depth to reflect the added responsibility of the supervisor position.

4.3.5 Continuing Training

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.d Introduction

Continuing Training Requirements. Continuing training programs shall be established to maintain and enhance the knowledge and skills of operating organization personnel who perform functions associated with engineered safety features as identified in the facility Safety Analysis Report. The guidance in DOE-STD-1060-93, Guide to Good Practices for Continuing Training, should be used to develop continuing training programs that improve the knowledge and skills of operating organization personnel.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.d.(1)

These programs shall be structured commensurate with specific position needs, and shall be administered on a cycle not to exceed two years. Continuing training shall include, at a minimum, 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.

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REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.d.(2)

Periodic examinations (written, oral, operational evaluations, performance demonstrations, as applicable to the position) shall be administered and documented throughout the cycle on material included in the operator (operators and their immediate supervisors) training programs. Periodic examinations (written and/or performance demonstrations) of other members of the operating organization (i.e., maintenance personnel, technicians, technical staff) is also appropriate in some areas during the continuing training program.

4.3.6 Technical Support Personnel Training

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 903

Training and retraining programs for radiological control technicians shall be established and conducted at intervals not to exceed 2 years to familiarize technicians with the fundamentals of radiation protection and the proper procedures for maintaining exposures ALARA. This program shall include both classroom and applied training. The training shall either precede performance of tasks assigned to radiological control technicians or be concurrent with such task assignments if the individual is accompanied by and under the direct supervision of a trained individual. The required level of knowledge of radiation safety possessed by radiological control technicians shall be verified by examination to include demonstration prior to any unsupervised work assignment. The training program shall include procedures specific to the site or facility where the technician is assigned. The level of training shall be commensurate with the technician's assignment. Allowance may be made for previous DOE training on generic radiation safety topics (i.e., those not specific to a site or facility), provided the training was received within the past 2 years. Documentation of the previous training shall clearly identify the individual's name, date of training, topics covered, and name of the certifying individual.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.h.(1)

The contractor shall develop a list of specific technical staff positions that have a direct impact on employee, facility, or public safety.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 7.h.(2)

Training shall be provided to entry-level technical staff personnel who provide technical support to the operating organization. Training in the following facility-specific subject areas shall be included as appropriate to the position:

- (a) Facility organization;
- (b) Facility fundamentals;
 - 1 Heat transfer, fluid flow, and thermodynamics

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- 2 Electrical science
 - 3 Nuclear physics
 - 4 Chemistry/chemistry controls
 - 5 Process controls
-
- (c) Facility systems, components, and operations;
 - (d) Simulator training;
 - (e) Environment, Safety, and Health Orders;
 - (f) Codes and standards overview;
 - (g) Facility document system;
 - (h) Safety Analysis Reports and Technical Safety Requirements;
 - (i) Nuclear criticality control;
 - (j) Material, maintenance, and modification control;
 - (k) ALARA and radwaste reduction program; and
 - (l) Quality Assurance/Quality Control practices.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter IV, Section 2.f

Technical Staff. Personnel in these positions are responsible for supervision and performance of technical support functions for the operating organization. Personnel involved in surveillance, testing, analyzing facility data, planning modifications, program review, and technical problem resolution in their area of expertise are also included. They have expertise in mechanical, electrical, instrumentation and control, chemistry, radiation protection, safety, or quality assurance/independent assessment. For personnel assigned to equivalent positions, non-reactor nuclear facilities should use the education and experience requirements contained in Chapter II, Category A Reactor Personnel, paragraph 2c. For positions for which there is no equivalent, the education and experience requirements are as listed below. The education and experience requirements listed below apply to supervisory positions or positions with authority to make independent decisions or to review and concur, and not to entry-level positions.

(1) Education: Baccalaureate in engineering or related science

(2) Experience:

Job related	2 years
Nuclear	1 year

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter IV, Section 2.g.(1)

Training Coordinators.

(a) Education: High School Diploma

(b) Experience:

Nuclear	2 years
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Onsite

6 months

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter IV, Section 2.g.(2)

Training Instructors.

- (a) Education: High School Diploma
- (b) Experience: Consistent with the material being presented.
- (c) Special Requirements:

1 Instructors who are responsible for instruction on subjects such as Technical Safety Requirements shall have received training on facility operating characteristics and principles, and operating limits (Safety Limits, Limiting Control Settings, and Limiting Conditions for Operation) and their bases; and

2 Instructors shall have demonstrated knowledge of instructional techniques through training or experience and be qualified by the Training Manager (or equivalent) for the material being presented.

REQUIREMENT SOURCE: DOE-STD-1073-93, Chapter 1, Section 1.3.1.6, Paragraph 1, Sentence 3

The CM program should include training on CM concepts, terminology, definitions, and procedures.

4.4 Training Records and Documentation

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 704(a)

Author's Note: This citation applies to the 324 Building only for training records developed to demonstrate compliance with the facility responsibilities of the requirements of 10 CFR 835 Part 901(a) and 10 CFR 835 Part 901(b). The requirements of 10 CFR 835 Part 902 and 10 CFR 835 Part 903 are a Site level responsibility.

Training records shall be maintained, as necessary, to demonstrate compliance with §§835.901, 835.902, and 835.903.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 15 Introduction

RECORD REQUIREMENTS. Contractors shall develop and implement administrative procedures that specify requirements for the maintenance of training, qualification, and certification records for operating organization personnel. The guidance in the Nuclear Information and Records Management Association Guidelines for Management of Nuclear Related Training Records, TG-17 should be used to help standardize identification, handling, and storage of training records.

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REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 15.a

Qualification and certification of personnel shall be documented in an easily auditable format. Individual record documentation shall include the following at a minimum:

- (1) Education, experience, and employment history and most recent health evaluation summary (e.g., similar to NRC Form 396);
- (2) Training programs completed and qualification/certification achieved;
- (3) Latest completed checklists, graded written examinations (with answers corrected as necessary or examination keys), simulator examinations (where applicable), and operational evaluations used for certification (this requires controlling access to training records to maintain examination security). The record should include an evaluation of knowledge and performance during operational evaluations;
- (4) Lists of questions asked and the examiner's overall evaluation of the responses on oral examinations;
- (5) Correspondence relating to exceptions to training requirements and extensions of qualification/certification;
- (6) Records of qualification for one-time-only special tests or operations; and
- (7) Attendance records for required training courses or sessions.

REQUIREMENT SOURCE: DOE ORDER 5480.20A, Chapter I, Section 15.b

Author's Note: DOE 1324.2A has been replaced by DOE 1324.5B.

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. Superseded information should be handled in accordance with DOE 1324.2A, RECORDS DISPOSITION.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 7, Part 2, Article 725.5

The following instructional materials shall be maintained:

- a. Course name, with revision and approval date;
- b. Instructor's manuals, course content, or lesson plans containing topical outlines;

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- c. Video and audio instructional materials, including the dates and lessons for which they were used;
- d. Handouts or other materials retained with the master copy of the course;
- e. Job-specific training documents, such as instrument use, radiological procedures, Radiological Work Permit special training requirements, pre-job briefings and mock-up training.

4.5 Accreditation

The 324 Building training program is not subject to the accreditation requirements of DOE Order 5480.18B, Nuclear Facility Training Accreditation Program, dated 8-31-94.

4.6 Key Interfaces

The Training and Qualification Functional Area interfaces with all other Functional Areas through the provision of general 324 Building training programs and support of other Functional Area specific training needs as identified and defined by the managers of each Functional Area. Key interfaces include: Management Systems, Quality Assurance (QA), Emergency Management, Engineering, Operations, Maintenance, Radiation Protection, and Occupational Safety and Health, and others to a lesser extent.

4.6.1 Management Systems

Training and Qualification programs support the consistent and effective performance of the vital information processes governed by 324 Building Management Systems. Generally, training provides an established mechanism for staff selection (through minimum qualification criteria), definition of initial and continuing training content, etc. Training in each management system area transfers understanding in program processes, responsibilities, knowledge of requirements, and the importance of compliance, safety, and accountability and will be provided as identified by management.

4.6.2 Quality Assurance

Formal training for personnel assigned to Quality Assurance (QA)/Quality Control (QC)/Nondestructive Examination (NDE) tasks is provided to ensure consistent and effective accomplishment of their job functions. Training needs and requirements should be identified by the management of the QA Functional Area at the site level and at each facility and should include both education in work related principles and should contribute to the enhancement of skills and practices. Training should provide an understanding of: processes and tools being used, the extent of variability of those processes, or tools, and

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the degree of control available over those variables, quality standards, potential consequences of improper work, special skills, and proficiency criteria. QA/QC/NDE personnel should be provided with continuing training, including re-certification where required, to ensure professional proficiency is maintained. Training should provide both general and specialized training (i.e., inspection and audit personnel) to meet the Quality Assurance organizations' performance needs. QA related training should also be provided for personnel in specific categories of jobs, such as; operators, designers, managers, supervisors, crafts, inspectors, and others.

4.6.3 Configuration Management

Formal training in Configuration Management provides improved operations and enhanced understanding in the integrated management of technical information. The Manager of the Configuration Management Functional Area should identify training needs and requirements to address training to ensure the consistent utilization of vital site and facility information pertaining to: design, maintenance, engineering, construction, operations, safety, and information management (document control and records management).

4.6.4 Emergency Management

Formal training for Emergency Management is required as defined by the management of the Emergency Management functional area to support three distinct audiences; general employee training, the Hanford emergency response organization (ERO), and off-site response organizations. Detailed ERO (and off-site team) training should address: chain of command, E-Plan execution, procedural adherence, equipment utilization, emergency operations center, special precautions and limitations, identification and assessment of job related hazards, scheduling and execution of drills, public interface issues, radiological and hazardous material properties, emergency response skills, and emergency controls, lessons learned from previous drills, among other related topics. General employee training should include: alarm recognition and response, response actions, and other 324 Building specific information.

4.6.5 Safeguards and Security

Formal training for the Safeguards and Security Functional Area promotes understanding and performance in the key areas of personnel access and material protection. Training needs and requirements should be identified by the management of the Safeguards and Security Functional Area and should address: personnel security, proper badging, visitor control, site wide security education, and select security procedures such as computer security and classified automated data processing and inventory control systems. This

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S/RID contains the requirements for general employee training; training requirements specific to Safeguards and Security and/or for the training of Safeguards and Security personnel are detailed in the Safeguards and Security S/RID.

4.6.6 Engineering Program

The technical tasks associated with engineering, design, and safety analysis require the formal training and qualification processes reflected by professional engineering standards. Formal training develops and maintains technical competence in the areas of: system, facility, and site design, facility and site assessment, design control process, field change modifications, construction, design basis development, configuration change evaluations, safety and non-safety class systems, hazards assessment, among others. Formal training establishes training criteria, proficiency requirements, and qualifications, as needed, for review and approvals of engineering documents. Engineering Management and Supervision should identify training needs and requirements, review lesson plans, monitor training effectiveness, and provide periodic evaluations to promote self improvement.

4.6.7 Construction Program

Construction Program Functional Area management identify training needs and requirements to ensure construction supervisors and staff involved in new construction and modification activities are qualified and/or certified to the job positions assigned. This S/RID contains the requirements for general employee training; training requirements specific to Construction and/or for the training of Construction personnel are detailed in the 324 Building Construction Program S/RID Functional Area.

4.6.8 Operations

Formal training for the Operations Functional Area consists of various formats. Effective training should include classroom training for fundamentals and general training topics. Advanced syllabus items may involve simulator, laboratory, hands on, and on-the-job field applications of classroom knowledge through the demonstration of practical factor performance and on shift experience. The management of the Operations Functional Area should identify training needs and requirements for training that should include: conduct of operations, As-Low-As-Reasonably-Achievable (ALARA), key elements as defined in DOE Order 5480.19, professional development, medical and fitness for duty requirements, procedural adherence, and continuous compliance with analyzed safety parameters.

4.6.9 Maintenance

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Formal training of Maintenance personnel is determined by the 324 Building Maintenance Manager (See the Maintenance Functional Area document) and includes comprehensive lesson plans and curriculum for the initial and continued training of key maintenance positions. Close teaming with the training organization in course development, training plans and schedules, qualification and certification programs, and identification of continued proficiency requirements commensurate with designated job descriptions is essential. Training syllabi should include: maintenance work practices, ALARA, personal safety techniques, tool and equipment control, decontamination, maintenance records, work package development and tracking, configuration controls, modifications, and field changes, among others. This S/RID contains the general training requirements for employee training; training requirements specific to Maintenance and/or for the training of Maintenance personnel are detailed in the Maintenance S/RID.

4.6.10 Radiation Protection

Formal training provides both general and specific training curricula in the area of radiation protection. Training needs and requirements are identified by the management of the Radiation Protection functional area and should include: technician specific training and qualification, supervisor discipline training, radiological monitoring, personnel exposure control, entry and exit controls, contamination control techniques, radioactive materials handling, radiological barriers, QA records, ALARA and radiological control curriculum, radiological hazards, worker awareness, Radiation Protection certifications, examinations, normal and emergency responses to radiological situations, lessons learned from Operations, Occurrence Reporting across the site and the DOE complex, and other related Radiation Protection topics. This S/RID contains requirements for Radiological General Employee Training; training requirements specific to Radiation Protection and/or for all other radiological protection training such as Radiation Worker Training and Radiological Control Technician Training, etc., are detailed in the Radiation Protection S/RID.

4.6.11 Fire Protection

Formal training in the Fire Protection Functional Area is essential to ensure the personnel safety and high performance of any individual assigned within the fire protection organization, the fire department brigade, apparatus drivers, fire test and inspection personnel, and any other persons with responsibilities for fire safety. Training program content and needs should be identified by Fire Protection management to reflect the applicable criteria contained in the identified mandatory Fire Protection Functional Area codes and standards and should consider facility specific characteristics. Training programs should emphasize fire hazards, fire alarms and response, fire prevention,

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communications, general safety, and other related topics. Qualification and certification programs should be identified for facility operators, fire investigators, emergency medical personnel, fire officers, and fire service inspectors, among others. This S/RID contains the requirements for general employee training; training requirements specific to Fire Protection and/or for the training of Fire Protection personnel are detailed in the Fire Protection S/RID.

4.6.12 Packaging and Transportation

Formal training for the Packaging and Transportation Functional Area provides appropriate personnel with a detailed understanding of hazardous materials, safety precautions, applicable Federal, State and local regulations as well as pertinent DOE Orders. Training syllabi developed in accordance with the needs and requirements identified by Packaging and Transportation management should include, among others: regulations governing the packaging, labeling, container requirements, security, and allowed forms of transportation, etc.

4.6.13 Environmental Restoration

This functional area is not applicable to the 324 Building.

4.6.14 Decontamination and Decommissioning

This functional area is not applicable to the 324 Building.

4.6.15 Waste Management

Formal training for the Waste Management area provides the transfer mechanism for understanding and ensuring consistent and continuous compliance to regulatory statutes regarding waste management. Key training topics as identified by the management of the Waste Management Functional Area may include: waste system operations, waste stream management, emergency response, hazardous waste safety, waste handling procedures, procedural adherence, waste minimization methods and practices, communications, and other related training topics.

4.6.16 Research and Development and Experimental Activities

This functional area is not applicable to the proposed 324 Building Operations.

4.6.17 Nuclear Safety

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Formal training for Nuclear Safety personnel provides general and specialized training in supporting professional development and qualification in specific job functions. Nuclear safety training should include: risks associated with facility operations, location, design basis, and operations of pertinent safety systems, configuration change control procedures, safety analysis of technical issues, operational safety requirements, response to nuclear criticality among others. Training should promote technical competence, professional skills, and practical application of theoretical knowledge commensurate with job positions.

4.6.18 Occupational Safety and Health

Formal training in Occupational Safety and Health, as defined by the management of the functional area ensures consistent and thorough understanding of fundamentals for general employees, managers/supervisors, and ensures visitors and contractors are adequately trained prior to performing work. Essential safety topics include: health and safety issues, medical and fitness for duty requirements, among others. The Occupational Safety and Health Act (OSHA) training program also facilitates the continued professional development of the safety and health staff through training courses, seminars, conferences, laboratory experience, field studies and other learning activities.

4.6.19 Environmental Protection

Formal training in the area of Environmental Protection is defined by the management of the Environmental Protection Functional Area. Key areas should include: monitoring and surveillance systems, inspection requirements, permit management, pollution control, records and reports, pollution prevention techniques, waste minimization, quality of records, procedural adherence, safety, ALARA, emergency response, contingency planning, and other related topics.

4.7 References

4.7.1 Requirement Source Documents

See the attached "RIDS by Document X-Reference Listing" for the documents used as requirements sources in the development of this Functional Area.

4.7.2 Reviewed Documents Not Used as Requirement Sources

The following documents were reviewed as requirements sources but were not used in the development of this S/RID:

49CFR172, Hazardous Materials Table, Special Provisions, Hazardous Material

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Communications Requirements and Emergency Response Information Requirements
10/1/92.

WAC-296-155, Safety Standards: Construction Work, 1993

DOE 5400.1, General Environmental Protection Program, 11/9/88.

DOE 5480.4, Environmental Protection, Safety, and Health Protection Standards, Change
4, 1/7/93.

DOE 5480.7A, Fire Protection, 2/17/93.

DOE 5480.9A, Construction Project Safety and Health Management, 4/13/94.

DOE 5480.18B, Nuclear Facility Accreditation Training Program, 8/31/94.

DOE 5480.21, Unreviewed Safety Questions, 12/24/91.

DOE 5483.1A, Occupational Safety and Health Program For DOE Contractor Employees
at Government-Owned Contractor-Operated Facilities, 6/22/83.

DOE 5700.6C, Quality Assurance, 8/21/91.

DOE 5820.2A, Radioactive Waste Management, 9/26/88.

DOE/EH0135, Performance Objectives and Criteria for Technical Safety Appraisals at
Department of Energy Facilities and Sites, 6/28/90.

DOE-RL-92-36, Hanford Site Hoisting and Rigging Manual, 1/15/93.

DOE-STD-1070-94, DOE Standard For Evaluation of Nuclear Facility Training Programs,
6/1/94.

RLID 5480.7, Fire Protection, Rev. 0, 1/17/94.

NIRMA-PP02-1989, Position Paper on Configuration Management, Rev. 0, 1/1/89.

ANSI/ANS-8.20, Nuclear Criticality Safety Training, 1991.

ANSI-Z88.2-1992, Respiratory Protection, Rev. 3, 8/6/92.

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ASME-NQA-1-1994, Quality Assurance Program Requirements for Nuclear Facilities Applications, 7/29/94.

BMP-87-006, Report on Configuration Management in the Nuclear Utility Industry, Rev. 0, 7/1/87.

BMP-90-009-1992-R1, Guidelines for the Conduct of Design Engineering, Rev. 1, 2/1/92.

54FR3904, Federal Register: Safety and Health Program Management Guidelines; Issuance of Voluntary Guidelines, 1/26/89.

SNT-TC-1A, American Society for Nondestructive Testing, 08/84.

RIDs by Document X-Reference Listing
Based on 324-TN-SD RID and including all documents.

10 CFR 830, Nuclear Safety Management, Dated 04-05-94

10 CFR 835, Occupational Radiation Protection, Dated 12-14-93

29 CFR 1910, Occupational Safety and Health Standards, Dated 07-01-95

DOE ORDER 4330.4B, Maintenance Management Program

DOE ORDER 5480.19, Conduct of Operations Requirements for DOE Facilities, Revision C01

DOE ORDER 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities

DOE ORDER 5500. 3A, Planning and Preparedness For Operational Emergencies, Revision C01

DOE-STD-1073-93, Guide for Operational Configuration Management Program

DOE/EH-0256T, U.S. Department of Energy Radiological Control Manual, Revision 1

WAC 173-303, Dangerous Waste Regulations, Dated 11-01-95

***** End of RIDs by Document X-Reference Listing *****

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EMERGENCY MANAGEMENT

5.0 Emergency Management

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract level S/RID contains standards/requirements applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract level S/RID.

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For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the functional area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

5.1 Management and Administration

5.1.1 Program Policy

Emergency Management program policy is determined by senior management and demonstrated throughout emergency planning, preparedness and response programs. Policy is addressed at the FDH Contract level on behalf of 324 Building.

5.1.2 Duties, Responsibilities, and Authorities for Program Management

REQUIREMENT SOURCE: DOE ORDER 5500. 1B, Revision C01, Section 10.w(26)(a)2

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Ensure immediate mitigative and corrective emergency response actions and appropriate protective action recommendations to minimize the consequences of the emergency, protect worker and public health and safety, provide security, and ensure the continuance of such actions until the emergency is resolved;

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 10.c(5)(d)

Directs and takes appropriate emergency response actions within the site boundary under its control and at the scene of the emergency.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.a

Author's Note: The following statements in this requirement are not applicable to 324 Building: Offsite Response Interface; Medical Support; Public Information; Exercises. Medical Support is a Hanford Fire Department requirement. Others are FDH Contract level requirements.

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. 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.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(13)(a)

Author's Note: The 324 Building emergency management administrator is not responsible for development of the Emergency Readiness Assurance Plan (ERAP) and annual updates, or development of exercise programs. These are FDH Contract level requirements.

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. 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.

5.1.3 Duties, Responsibilities and Authorities for ERO

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(1)

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Author's Note: 324 Building is not responsible for the following statements in (a): medical support, public information, coordination and liaison with offsite support and response organizations. Medical support is a Hanford Fire Department requirement. Other statements FDH Contract requirements. Paragraph (d) is performed by DOE-RL and is not applicable at 324 Building.

Emergency Response Organization. An element with clearly specified authorities and responsibilities for emergency response and mitigation have overall responsibility for the initial and ongoing response to, and mitigation of, an emergency, and must:

- (a) 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;
- (b) Consist of an adequate number of experienced and trained personnel, including designated alternates, for timely performance of the functions identified above;
- (c) Assign emergency response responsibilities and tasks to specific individuals identified by name, title, or position; and
- (d) 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.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 360(1)

Emergency coordinator. At all times, there must be at least one employee either on the facility premises or on call with the responsibility for coordinating all emergency response measures. This emergency coordinator must be thoroughly familiar with all aspects of the facility's contingency plan, required by WAC 173-303-350(2), all operations and activities at the facility, the location and properties of all wastes handled, the location of all records within the facility, and the facility layout. In addition, this person must have the authority to commit the resources needed to carry out the contingency plan.

5.2 Emergency Response Training

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 120(p)(8)(iii)(A)

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(iii) Training.

(A) Training for emergency response employees shall be completed before they are called upon to perform in real emergencies. Such training shall include the elements of the emergency response plan, standard operating procedures the employer has established for the job, the personal protective equipment to be worn and procedures for handling emergency incidents.

Exception #1: An employer need not train all employees to the degree specified if the employer divides the work force in a manner such that a sufficient number of employees who have responsibility to control emergencies have the training specified, and all other employees, who may first respond to an emergency incident, have sufficient awareness training to recognize that an emergency response situation exists and that they are instructed in that case to summon the fully trained employees and not attempt control activities for which they are not trained.

Exception #2: An employer need not train all employees to the degree specified if arrangements have been made in advance for an outside fully-trained emergency response team to respond in a reasonable period and all employees, who may come to the incident first, have sufficient awareness training to recognize that an emergency response situation exists and they have been instructed to call the designated outside fully-trained emergency response team for assistance.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 120(p)(8)(iii)(B)

(B) Employee members of TSD facility emergency response organizations shall be trained to a level of competence in the recognition of health and safety hazards to protect themselves and other employees. This would include training in the methods used to minimize the risk from safety and health hazards; in the safe use of control equipment; in the selection and use of appropriate personal protective equipment; in the safe operating procedures to be used at the incident scene; in the techniques of coordination with other employees to minimize risks; in the appropriate response to over exposure from health hazards or injury to themselves and other employees; and in the recognition of subsequent symptoms which may result from over exposures.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 120(p)(8)(iii)(C)

(C) The employer shall certify that each covered employee has attended and successfully completed the training required in paragraph (p)(8)(iii) of this section, or shall certify the employee's competency at least yearly. The method used to demonstrate competency for certification of training shall be recorded and maintained by the employer.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(11)(b)
Introduction

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

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incidents.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(11)(b)(2)

Annual retraining shall include training on weaknesses detected during drills and exercises, changes to plans, procedures, and lessons learned from emergencies at DOE and other industrial facilities.

5.3 Planning Documents

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(13)(b)

The emergency plan and implementing procedures shall be controlled distribution documents and shall be annually reviewed and updated.

5.3.1 Hazards Assessment

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.b.(1)

Author's Note: Although Dyncorp Emergency Preparedness has the lead for preparing the hazard assessments at the contract level, facility participation is also required.

Hazards Assessment. A hazards assessment shall be prepared and maintained for each facility and shall be used for emergency planning purposes. 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. This hazards assessment shall be derived from information provided by the assessment of the potential DOE requirements. The use of vulnerability and target analyses may include sensitive or classified information which will need special handling.

5.3.2 Emergency Plan

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 38(a)(4)

Evacuation. The employer shall establish in the emergency action plan the types of evacuation to be used in emergency circumstances.

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REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.d.(1)

Author's Note: 324 Building meets subsections (a) and (c) through the Hanford Site emergency plan. FDH Contract level Emergency Management is responsible for ensuring their contents and format requirements are compatible with applicable DOE, Federal, state, tribal, and local emergency plans. Copies are required to be maintained at the facility.

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.

- (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 (e.g., diagrams, illustrations, maps, and transportation routes). The emergency plan must reference procedures and supporting material (i.e., PRAs, MSSAs, EAs, EISs, etc.) which may be used by emergency response personnel.
- (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.
- (c) 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. The emergency plan must integrate the response plans for specific incidents (e.g., fire medical, security, and natural phenomena).

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 350(2)

Contingency plan. Each owner or operator must have a contingency plan at his facility for use in emergencies or sudden or nonsudden releases which threaten the public health and the environment. If the owner or operator has already prepared a spill prevention control and countermeasures (SPCC) plan in accordance with Part 112 of Title 40 CFR or Part 1510 of chapter V, or some other emergency or contingency plan, he need only amend that plan to incorporate dangerous waste management provisions that are sufficient to comply with the requirements of this section and WAC 173-303-360.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 350(3)

The contingency plan must contain the following:

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- (a) A description of the actions which facility personnel must take to comply with this section and WAC 173-303-360;
- (b) A description of the actions which will be taken in the event that a dangerous waste shipment, which is damaged or otherwise presents a hazard to the public health and the environment, arrives at the facility, and is not acceptable to the owner or operator, but cannot be transported, pursuant to the requirements of WAC 173-303-370(5), Manifest system, reasons for not accepting dangerous waste shipments;
- (c) A description of the arrangements agreed to by local police departments, fire departments, hospitals, contractors, and state and local emergency response teams to coordinate emergency services as required in WAC 173-303-340(4);
- (d) A current list of names, addresses, and phone numbers (office and home) of all persons qualified to act as the emergency coordinator required under WAC 173-303-360(1). Where more than one person is listed, one must be named as primary emergency coordinator, and others must be listed in the order in which they will assume responsibility as alternates. For new facilities only, this list may be provided to the department at the time of facility certification (as required by WAC 173-303-810 (14)(a)(i)), rather than as part of the permit application;
- (e) A list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems, and decontamination equipment), where this equipment is required. This list must be kept up to date. In addition, the plan must include the location and a physical description of each item on the list, and a brief outline of its capabilities; and
- (f) An evacuation plan for facility personnel where there is a possibility that evacuation could be necessary. This plan must describe the signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 350(4)

Author's Note: Item (b) is not applicable.

Copies of contingency plan. A copy of the contingency plan and all revisions to the plan must be:

- (a) Maintained at the facility; and
- (b) Submitted to all local police departments, fire departments, hospitals, and state and local emergency response teams that may be called upon to provide emergency services.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 350(5)

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Amendments. The owner or operator must review and immediately amend the contingency plan, if necessary, whenever:

- (a) Applicable regulations or the facility permit are revised;
- (b) The plan fails in an emergency;
- (c) The facility changes (in its design, construction, operation, maintenance, or other circumstances) in a way that materially increases the potential for fires, explosions, or releases of dangerous waste or dangerous waste constituents, or in a way that changes the response necessary in an emergency;
- (d) The list of emergency coordinators changes; or
- (e) The list of emergency equipment changes.

REQUIREMENT SOURCE: WAC 296- 62, Dated 09-12-94, Section 3140(8)(a)(b)

Emergency response program.

(a) Emergency response plan. An emergency response plan shall be developed and implemented by all employers. Such plans need not duplicate any of the subjects fully addressed in the employer's contingency planning required by permits, such as those issued by the United States Environmental Protection Agency, provided that the contingency plan is made part of the emergency response plan. The emergency response plan shall be a written portion of the employer's safety and health program required in this section. Employers who will evacuate their employees from the worksite location when an emergency occurs and who do not permit any of their employees to assist in handling the emergency are exempt from the requirements of WAC 296-62-3140(8) if they provide an emergency action plan complying with WAC 296-24-567.

(b) Elements of an emergency response plan. The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following areas to the extent that they are not addressed in any specific program required in this section:

- (i) Preemergency planning and coordination with outside parties.
- (ii) Personnel roles, lines of authority, and communication.
- (iii) Emergency recognition and prevention.
- (iv) Safe distances and places of refuge.
- (v) Site security and control.

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- (vi) Evacuation routes and procedures.
- (vii) Decontamination procedures.
- (viii) Emergency medical treatment and first aid.
- (ix) Emergency alerting and response procedures.
- (x) Critique of response and follow-up.
- (xi) PE and emergency equipment.

REQUIREMENT SOURCE: WAC 296- 62, Dated 09-12-94, Section 3140(8)(d)

Procedures for handling emergency incidents.

(i) In addition to the elements for the emergency response plan required in (b) of this subsection, the following elements shall be included for emergency response plans to the extent that they do not repeat any information already contained in the emergency response plan:

(A) Site topography, layout, and prevailing weather conditions.

(B) Procedures for reporting incidents to local, state, and federal governmental agencies.

(ii) The emergency response plan shall be compatible and integrated with the disaster, fire, and/or emergency response plans of local, state, and federal agencies.

(iii) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.

(iv) The site emergency response plan shall be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.

(v) An employee alarm system shall be installed in accordance with WAC 296-24-631 to notify employees of an emergency situation; to stop work activities if necessary; to lower background noise in order to speed communication; and to begin emergency procedures.

(vi) Based upon the information available at time of the emergency, the employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the site emergency response plan.

5.3.3 Emergency Implementing Procedures

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REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.c(4)(f)

Procedures shall be established for emergency actions involving chemical carcinogens (e.g., cleanup of spills or accidental releases). 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).

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.d.(2)

Procedures which describe how the emergency plan shall be implemented.

(a) Procedures must consist of special emergency plan implementing procedures (e.g., EALs, event categorization, notification, EOC operation) as well as other procedures currently in use (e.g., equipment operation, chemistry controls, radiological monitoring, and maintenance) which would be utilized in, or associated with, emergency response activities.

(b) 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. Procedures must clearly and concisely identify the individual(s) responsible for performance of response activities and delineate the specific actions steps to be performed. Procedures must identify the relevant prerequisites (i.e., conditions which must exist prior to specific actions being performed) and precautions (regarding personnel safety and equipment operation) associated with the response actions.

5.4 Facilities, Equipment and Resources

5.4.1 Emergency Response Facilities

The requirement for this subelement are included in the FDH Contract level S/RID.

5.4.2 Emergency Equipment and Supplies

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 134(b)(7), Last Sentence

Respirators for emergency use such as self-contained devices shall be thoroughly inspected at least once a month and after each use.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 134(f)(2)(iv)

Author's Note: PTL does not perform maintenance of respirators.

A record shall be kept of inspection dates and findings for respirators maintained for emergency use.

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REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(10)(d)

Adequate equipment and supplies must be available and operable for emergency response personnel to carry out their respective duties and responsibilities.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 340 Introduction and (1)

Author's Note: The subsection (b) statement pertaining to summoning local police departments pertains to the Hanford Patrol at the facility level. The subsection (b) statement concerning summoning emergency assistance from state or local emergency response teams is not applicable at the facility level. The facilities do not request offsite assistance.

The subsection (d) statement pertaining to "Water a adequate volume and pressure supply water hose streams, foam producing equipment, automatic sprinklers, or water spray systems" is a responsibility at the facility level. These requirements are Fire Protection and/or the Hanford Fire Department.

Facilities must be designed, constructed, maintained and operated to minimize the possibility of fire, explosion, or any unplanned sudden or nonsudden release of dangerous waste or dangerous waste constituents to air, soil, or surface or ground water which could threaten the public health or the environment. This section describes preparations and preventive measures which help avoid or mitigate such situations.

(1) Required equipment. All facilities must be equipped with the following, unless it can be demonstrated to the department that none of the hazards posed by waste handled at the facility could require a particular kind of equipment specified below:

(a) An internal communications or alarm system capable of providing immediate emergency instruction to facility personnel;

(b) A device, such as a telephone or a hand-held, two-way radio, capable of summoning emergency assistance from local police departments, fire departments, or state or local emergency response teams;

(c) Portable fire extinguishers, fire control equipment (including special extinguishing equipment, such as that using foam, inert gas, or dry chemicals), spill control equipment, and decontamination equipment; and

(d) Water at adequate volume and pressure to supply water hose streams, foam producing equipment, automatic sprinklers, or water spray systems.

All facility communications or alarm systems, fire protection equipment, spill control equipment,

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and decontamination equipment, where required, must be tested and maintained as necessary to assure its proper operation in time of emergency.

5.4.3 Communications Equipment

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 38(a)(3)

Alarm system.

- (i) The employer shall establish an employee alarm system which complies with § 1910.165.
- (ii) If the employee alarm system is used for alerting fire brigade members, or for other purposes, a distinctive signal for each purpose shall be used.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Part 165(b)

General requirements.

- (1) The employee alarm system shall provide warning for necessary emergency action as called for in the emergency action plan, or for reaction time for safe escape of employees from the workplace or the immediate work area, or both.
- (2) The employee alarm shall be capable of being perceived above ambient noise or light levels by all employees in the affected portions of the workplace. Tactile devices may be used to alert those employees who would not otherwise be able to recognize the audible or visual alarm.
- (3) The employee alarm shall be distinctive and recognizable as a signal to evacuate the work area or to perform actions designated under the emergency action plan.
- (4) The employer shall explain to each employee the preferred means of reporting emergencies, such as manual pull box alarms, public address systems, radio or telephones. The employer shall post emergency telephone numbers near telephones, or employee notice boards, and other conspicuous locations when telephones serve as a means of reporting emergencies. Where a communication system also serves as the employee alarm system, all emergency messages shall have priority over all non-emergency messages.
- (5) The employer shall establish procedures for sounding emergency alarms in the workplace. For those employers with 10 or fewer employees in a particular workplace, direct voice communication is an acceptable procedure for sounding the alarm provided all employees can hear the alarm. Such workplaces need not have a back-up system.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 340(2)

Access to communications or alarms. Personnel must have immediate access to the signalling

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devices described in the situations below:

(a) Whenever dangerous waste is being poured, mixed, spread, or otherwise handled, all personnel involved must have immediate access to an internal alarm or emergency communication device, either directly or through visual or voice contact with another employee, unless such a device is not required in subsection (1) of this section;

(b) If there is ever just one employee on the premises while the facility is operating, he must have immediate access to a device, such as a telephone or a hand-held, two-way radio, capable of summoning external emergency assistance, unless such a device is not required in subsection (1) of this section.

5.5 Classification, Notification and Reporting

REQUIREMENT SOURCE: DOE ORDER 5500. 1B, Revision C01, Section 10.w(26)(a)1

Ensure the proper identification, categorization, and notification of emergencies or other reportable occurrences to line management and the HQ EOC, in accordance with applicable DOE policies and requirements;

5.5.1 Event Classification and Emergency Action Levels (EALs)

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 11.a.2(a)4b

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. Any release of hazardous materials (radiological or non-radiological) is expected to be limited to small fractions of the appropriate PAG or ERPG exposure limits.

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 11.a.2(a)4d

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). 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.

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 11.a.2(a)4e

Transportation. An Alert shall be declared when events are in progress or have occurred which involve an actual or potential substantial degradation of the safety of the shipment. Any release of hazardous materials (radiological or non-radiological) is expected to be limited to small fractions

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of the appropriate PAG or ERPG exposure levels.

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 11.a.2(b)7.b

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. Any release of hazardous materials (radiological or non-radiological) is expected to exceed appropriate PAG or ERPG exposure levels onsite but is not expected to exceed the appropriate PAGs or ERPGs offsite.

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 11.a.2(b)7.d

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.

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 11.a.2(b)7.e

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. Any release of hazardous materials (radiological or non-radiological) is expected to exceed appropriate PAG or ERPG exposure levels in the immediate vicinity of the accident or incident but is not expected to exceed the appropriate PAGs or ERPGs in a general public area.

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 11.a.2(c)7.b

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.

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 11.a.2(c)7.d

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.

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 11.a.2(c)7.e

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. Any release of

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hazardous materials (radiological or non-radiological) is expected to exceed appropriate PAG or ERPG exposure levels in a general public area. If the event has occurred on a DOE site, the release is expected to exceed appropriate PAG or ERPG exposure levels offsite.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(3)

Author's Note: Last sentence is not a facility requirement.

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. 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. EALs form the basis for notification and participation of offsite organizations and for determining what and when protective measures will be implemented. 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. The EALs and related information must be consistent and integrated with the emergency plans and procedures of offsite Federal, state, tribal, and local organizations, and should be reviewed annually, as appropriate, by all parties involved in response activities.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 360(2)

Author's Note: 324 Building is responsible for notifying the proper FDH Contract level level organization for (d)(i).

Emergency procedures. The following procedures must be implemented in the event of an emergency.

- (a) Whenever there is an imminent or actual emergency situation, the emergency coordinator (or his designee when the emergency coordinator is on call) must immediately:
 - (i) Activate internal facility alarms or communication systems, where applicable, to notify all facility personnel; and
 - (ii) Notify appropriate state or local agencies with designated response roles if their help is needed.
- (b) Whenever there is a release, fire, or explosion, the emergency coordinator must immediately identify the character, exact source, amount, and areal [sic] extent of any released materials.
- (c) Concurrently, the emergency coordinator must assess possible hazards to human health and the environment (considering direct, indirect, immediate, and long-term effects) that may result from

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the release, fire, or explosion.

(d) If the emergency coordinator determines that the facility has had a release, fire, or explosion which could threaten human health or the environment, he must report his findings as follows:

(i) If his assessment indicates that evacuation of local areas may be advisable, he must immediately notify appropriate local authorities. He must be available to help appropriate officials decide whether local areas should be evacuated; and

(ii) He must immediately notify the department and either the government official designated as the on-scene coordinator, or the National Response Center (using their 24-hour toll free number (800) 424-8802).

(e) His assessment report must include:

(i) Name and telephone number of reporter;

(ii) Name and address of facility;

(iii) Time and type of incident (e.g., release, fire);

(iv) Name and quantity of material(s) involved, to the extent known;

(v) The extent of injuries, if any; and

(vi) The possible hazards to human health or the environment outside the facility.

(f) During an emergency, the emergency coordinator must take all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other dangerous waste at the facility. These measures must include, where applicable, stopping processes and operations, collecting and containing released waste, and removing or isolating containers.

(g) If the facility stops operations in response to a fire, explosion, or release, the emergency coordinator must monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, wherever this is appropriate.

(h) Immediately after an emergency, the emergency coordinator must provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the facility.

(i) The emergency coordinator must ensure that, in the affected area(s) of the facility:

(i) No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed; and

(ii) All emergency equipment listed in the contingency plan is cleaned and fit for its intended use before operations are resumed.

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- (j) The owner or operator must notify the department, and appropriate local authorities, that the facility is in compliance with (i) of this subsection before operations are resumed in the affected area(s) of the facility.
- (k) The owner or operator must note in the operating record the time, date, and details of any incident that requires implementing the contingency plan. Within fifteen days after the incident, he must submit a written report on the incident to the department. The report must include:
- (i) Name, address, and telephone number of the owner or operator;
 - (ii) Name, address, and telephone number of the facility;
 - (iii) Date, time, and type of incident (e.g., fire, explosion);
 - (iv) Name and quantity of material(s) involved;
 - (v) The extent of injuries, if any;
 - (vi) An assessment of actual or potential hazards to human health or the environment, where this is applicable;
 - (vii) Estimated quantity and disposition of recovered material that resulted from the incident;
 - (viii) Cause of incident; and
 - (ix) Description of corrective action taken to prevent reoccurrence of the incident.

5.5.2 Notifications and Staff Augmentations

REQUIREMENT SOURCE: 40 CFR 355, Dated 07-01-95, Part 40(b)(2)

The notice required under this section shall include the following to the extent known at the time of notice and so long as no delay in notice or emergency response results:

- (i) The chemical name or identity of any substance involved in the release.
- (ii) An indication of whether the substance is an extremely hazardous substance.
- (iii) An estimate of the quantity of any such substance that was released into the environment.
- (iv) The time and duration of the release.
- (v) The medium or media into which the release occurred.

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(vi) Any known or anticipated acute or chronic health risks associated with the emergency and, where appropriate, advice regarding medical attention necessary for exposed individuals.

(vii) Proper precautions to take as a result of the release, including evacuation (unless such information is readily available to the community emergency coordination pursuant to the emergency plan).

(viii) The names and telephone number of the person or persons to be contacted for further information.

REQUIREMENT SOURCE: 40 CFR 355, Dated 07-01-95, Part 40(b)(3)

As soon as practicable after a release which requires notice under (b)(1) of this section, such owner or operator shall provide a written follow-up emergency notice (or notices, as more information becomes available) setting forth and updating the information required under paragraph (b)(2) of this section, and including additional information with respect to:

- (i) Actions taken to respond to and contain the release,
- (ii) Any known or anticipated acute or chronic health risks associated with the release, and,
- (iii) Where appropriate, advice regarding medical attention necessary for exposed individuals.

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 12.b(2)(a)

Author's Note: The facility provides timely notification to the Patrol Operations Center (POC), who in turn, makes the appropriate off-site notifications.

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;

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 12.b(2)(b)

Author's Note: During the incipient stages of the event, the facility shall make notification of emergency class evolutions to the POC. The POC will make the appropriate off-site notifications until such time as the RL Emergency Operations Center (RL EOC) becomes operational. At this point, the responsibility for off-site notification of emergency class changes will be assumed by the RL EOC.

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Concurrently notify the HQ EOC and the Field Element of all changes in the emergency class within 15 minutes of the redesignation;

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(4)

Notification. Notification and communication of emergency information must be consistent with the requirements of DOE 5000.3A and 5500.2B. Provisions must be in place for prompt initial notification of appropriate DOE elements and other Federal, state, tribal, and local organizations, and for continuing effective communication among the response organizations throughout an emergency. The content and format of the initial notification and follow-up messages must be prearranged and standardized in the emergency plan. The handling of classified and/or controlled information during an emergency must be in accordance with established procedures and DOE requirements.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.d.(3)

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:

Emergency records which contain information for review and reconstruction of major communications and actions taken during a emergency. These records include operator logs and documentation produced by the emergency response organization. These records shall be maintained by the individual responsible for program administration.

5.5.3 Reporting and Event Investigations

REQUIREMENT SOURCE: DOE ORDER 5500. 1B, Revision C01, Section 10.w(26)(a)5

Provide for investigation of root cause(s) and corrective actions to prevent recurrence;

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 12.b(2)(d)

Provide written reports concerning the emergency event as soon as practical but within 24 hours of event categorization; and

5.6 Event Containment and Personnel Protection

5.6.1 Event Containment and Consequence Assessment

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 11.a(2)(a)

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Alert. Declaration of an Operational Alert requires the availability of personnel and resources to:

- 1 Provide continuous assessment of pertinent information for DOE decision makers, offsite authorities, the public, and other appropriate entities;
- 2 Conduct appropriate assessments, investigations, or preliminary or confirmatory sampling and monitoring;
- 3 Mitigate the severity of the occurrence or its consequences; and
- 4 Prepare for other response actions should the situation become more serious, requiring emergency response organizations to mobilize or activate resources.

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 11.a.2(b)

Author's Note: Items 2 and 3 below are performed at the FDH Contract level and do not apply to the facility.

Site Area Emergency. 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:

- 1 Continuous assessment of pertinent information for DOE decision makers, offsite authorities, and other appropriate entities;
- 2 Establish communications, consultation, and liaison with offsite authorities;
- 3 Provide information to the public through offsite authorities and the media;
- 4 Conduct or assist in any evacuations and sheltering;
- 5 Conduct appropriate assessments, investigations, or sampling and monitoring;
- 6 Mitigate the severity of the actual or potential consequences; and
- 7 Mobilize appropriate emergency response groups or security forces for immediate dispatch should the situation become more serious.

REQUIREMENT SOURCE: DOE ORDER 5500. 2B, Revision C01, Section 11.a.2(c)

Author's Note: Items 2 and 3 below are performed at the FDH Contract level and do not apply to the facility.

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General Emergency. 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:

- 1 Activate the response centers and other emergency assets to provide continuous assessment of information;
- 2 Establish communications, consultation, and liaison with offsite authorities and recommend predetermined protective actions for the public;
- 3 Provide information to the public through offsite authorities and the media;
- 4 Conduct or assist in any evacuations;
- 5 Conduct appropriate assessments, investigations, or sampling and monitoring;
- 6 Mitigate the severity of the actual or potential consequences; and
- 7 Mobilize and dispatch appropriate emergency response groups or security forces.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(5)

Author's Note: Item (d) is performed at the FDH Contract level and does not apply to the facility.

Consequence Assessment. Provisions must be in place to adequately assess the actual or potential onsite and offsite consequences of an emergency and must include:

- (a) Timely initial assessment of the actual or potential consequences of an emergency and continuous, in-depth assessment of events throughout an emergency;
- (b) 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;
- (c) 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; and
- (d) Coordinate 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.

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REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(6)(e)

Determination of the area surrounding the specific facility actually affected by an Operation Emergency, and

5.6.2 Protective Actions

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(6)(b)

Author's Note: Only monitoring portion of this requirement is applicable to 324 Building personnel.

Control, monitoring, and maintenance of records of onsite personnel exposures to hazardous materials;

5.6.3 Personnel Accountability and Evacuation

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(6)(c)

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;

5.6.4 Medical Response

The Hanford Fire Department (HFD) provides emergency medical response. Requirements associated with this topic are located in the FDH Contract Fire Protection Functional Area.

5.7 Recovery and Reentry

5.7.1 Recovery

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1301(c)

When the conditions under which the emergency or accident exposures were received have been eliminated, operating management shall notify the Head of the responsible DOE field organization.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1301(d)

Operations after an emergency or accidental exposure in excess of the limits specified in §§835.202 or 835.205 may be resumed only with the approval of the DOE.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1301(e)

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Occurrence reports to DOE regarding emergencies and/or accidents shall be prepared and submitted in accordance with Departmental requirements for occurrence reporting and processing.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1302(a)

The risk of injury to those individuals involved in rescue and recovery operations shall be minimized.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1302(b)

Operating management shall weigh actual and potential risks to rescue and recover individuals against the benefits to be gained.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1302(c)

Rescue action that might involve substantial personal risk shall be performed by volunteers.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1302(d)

The dose limits for individuals performing these operations are as follows:

{REFER TO 10CFR835.1302(d) for Table}

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1302(e)

Each individual selected shall be trained in accordance with §835.902 and briefed beforehand of the known or anticipated hazards to which the individual will be subjected.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(8)

Author's Note: While the majority of this activity is performed by FDH Contract level EM, facility participation is required.

Recovery and Reentry. Provisions must be made for recovery from an Operational Emergency and reentry into the affected facility.

(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.

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(b) The means must exist for estimating dosage and for protecting workers and the general public from hazardous exposure during recovery and reentry activities.

5.7.2 Reentry

Reentry addressed by DOE 5500.3A Section 11.c(8) in Section 5.7.1 of this document.

5.8 Public Information

5.8.1 Public and Media Education

This is done at the FDH Contract level on behalf of 324 Building.

5.8.2 Emergency Public Information Response

This is done at the FDH Contract level on behalf of 324 Building.

5.9 Coordination with Offsite Agencies

These requirements are met at the FDH Contract level on behalf of 324 Building.

5.9.1 Management Coordination

This is done at the FDH Contract level on behalf of 324 Building.

5.9.2 Response Coordination

These requirements are met at the FDH Contract level on behalf of 324 Building.

5.10 Demonstrating, Monitoring and Improving Performance

5.10.1 Drill and Exercise Program

Only training and drills pertaining to 324 Building personnel apply at 324 Building. 324 Building is not responsible for providing participation with state, tribal, and local authorities. This is performed by FDH Contract level EM on behalf of 324 Building.

REQUIREMENT SOURCE: DOE ORDER 5500. 1B, Revision C01, Section 10.w(26)(a)3

Ensure a continuing program of training, drills, and exercises for facility personnel, and provide for participation by state, tribal, and local authorities;

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REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 11.c.(12)(a)

Drills must be used to develop and maintain personnel skills, expertise, and response capability. Drills must be of sufficient scope and frequency to ensure adequate response capability in all applicable areas. 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. 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.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5500. 3A, Revision C01, Section 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.

5.10.2 Reviews, Audits and Evaluations

This is performed by FDH Contract level EM on behalf of 324 Building.

5.10.3 Emergency Readiness Assurance Program

Emergency Readiness Assurance Program requirements are met at the FDH Contract level on behalf of 324 Building.

5.10.4 Deficiency Identification and Correction

REQUIREMENT SOURCE: DOE ORDER 5482.1B, Revision C01, Section 9.a(5)

The appraised organization shall respond to appraisal reports within 30 days of receipt and indicate what corrective action will be taken.

5.11 Key Interfaces

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Some interfaces are performed at the Site level by FDH Contract level EM per requirements documented in DOE-RL-94-02, Hanford Emergency Response Plan. 324 Building does not interface with DOE-HQ, DOE-RL, or offsite agencies (i.e., Federal, State, local, tribal, etc.). This is the responsibility of Site Emergency Management.

5.11.1 Safeguards and Security

324 Building EM and FDH Contract level EM interface with Safeguards and Security to develop security scenarios for emergency drills; to coordinate with local/state law enforcement organizations regarding emergency response support; to arrange access for designated offsite support groups during emergency situations (ambulance, fire, etc.); to coordinate accountability and lockdown provisions for emergencies.

5.11.2 Operations

324 Building EM and FDH Contract level EM interface with Operations to develop credible operational scenarios for emergency drills/exercises; to ensure coordination between emergency operating procedures and emergency plan implementing procedures; to implement plans for on-scene incident command during emergencies.

5.11.3 Training and Qualification

324 Building EM and FDH Contract level EM interface with 324 Building Training and FDH Contract level EM Training to ensure inclusion of appropriate emergency plan/response information in GET programs; and to ensure that ERO and offsite responder training is conducted to performance based training standards.

5.11.4 Radiation Protection

324 Building EM and FDH Contract level EM interface with Radiological Control for technical support to help ensure quality onsite and offsite monitoring and radiological dose assessment programs; for input for scenario development; and for personnel protection equipment and procedure development.

5.11.5 Waste Management

324 Building EM and FDH Contract level EM interfaces with Acceptance Services, Hazardous Material Operations, 324 Building Regulatory Compliance to ensure coordination between the RCRA Contingency Plan and the Site/Facility Emergency Plan; and coordination between Emergency Planning and Community Right-to-Know Act and

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Site/Facility Emergency Plan offsite interface programs.

5.11.6 Occupational Safety and Health

324 Building EM and FDH Contract level EM interfaces with FDH Contract ESQ, Safety (Industrial Hygiene) to coordinate compliance with OSHA requirements; for Industrial Safety and Hygiene input for scenario development; personnel protection procedure development; and to ensure sufficient respiratory monitoring equipment and supplies are available for non-rad emergency response.

5.11.7 Fire Protection

324 Building EM interfaces with Fire Protection concerning mutual aid agreements with offsite fire response groups; and to ensure fire response plans, training, drills, and exercises are appropriately referenced and integrated into site/facility emergency plan and procedures, training and drill/exercise program.

5.11.8 Medical

324 Building EM and FDH Contract level EM interfaces with the Site medical organization and fire department to ensure immediate medical response capability, and concerning agreements with offsite ambulance services and hospitals, and for medical scenario development and control.

5.11.9 Management Systems

324 Building EM and FDH Contract level EM interface with Management Systems to ensure that Management and Administration, Document Control and Records Management, Policy and Procedure Systems, Compliance Management, Corrective Action, Lessons Learned, Occurrence Reporting, and Self-Assessment activities correctly integrate site standards.

5.11.10 Nuclear Safety

324 Building EM and FDH Contract level EM interface with ESQ Nuclear Safety to input technical information necessary for the development of response plans and procedures.

5.11.11 Packaging and Transportation

324 Building EM and FDH Contract level EM interface with Hazardous Materials Operations and 324 Building Regulatory Compliance to provide appropriate emergency

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response information and carrier instructions, including organizations and authorities to be notified in the event of release of materials. Coordination between the Transportation Program and EM ensures that commonly handled hazardous materials are known and included in emergency plans for the facility, and that special equipment or vehicles for transportation are known and available for emergency situations.

5.11.12 Quality Assurance

324 Building EM and FDH Contract level EM interface with Quality Assurance (QA) to ensure that independent assessments, audits, and corrective action programs meet site QA standards. QA may perform independent assessments of the EM program.

5.11.13 Environmental Protection

324 Building EM and FDH level EM interface with Environmental Protection (EP) and 324 Building Regulatory Compliance to ensure hazardous material accident response and spill control, be it small or large, is effectively addressed.

5.12 References

5.12.1 Requirement Source Documents

For references, see attached report titled "RIDs by Document X-Reference Listing".

5.12.2 Reviewed Documents Not Used as Requirement Sources

The following documents were reviewed as requirement sources but were not used in the development of this EM Functional Area document. These documents were not used because the requirements contained in the above list were more prescriptive.

40 CFR 302, Designation Reportable Quantities, and Notification; EPA/ Superfund, Emergency Planning, and Community Right-to-Know Programs, 07/01/93 Edition.

40 CFR 265, Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities; EPA/Solid Wastes, 07/01/92 Edition.

40 CFR 355, Emergency Planning and Notification; EPA/Superfund, Emergency Planning, and Community Right-to-Know Programs, 07/01/93 Edition.

DOE O 232.1, Occurrence Reporting and Processing of Operations Information, 01/19/93, Page Change 1; 07/02/93.

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DOE 5480.19, Conduct of Operations Requirements for DOE Facilities, 07/09/90, Change 1: 05/18/92.

DOE 5500.4, Public Affairs Policy and Planning Requirements for Emergencies, 06/08/92.

DOE 5500.10, Emergency Readiness Assurance Program, 04/30/91, Page Change 1: 02/27/92.

DOE 5632.8, Protection Program Operations: System Performance Tests, 02/04/88.

DOE EMG-ADM, Program Administration, 12/11/91.

DOE EMG-CA, Guidance for Consequence Assessment, 07/28/92.

DOE EMG-EC, Guidance for Event Classification and Emergency Action Levels, 06/26/92.

DOE EMG-EMS, Interim Guidance for Emergency Medical Support, 06/26/92.

DOE EMG-ERO, Interim Guidance for Emergency Response Organization, 07/30/93.

DOE EMG-FAC/EQ, Interim Guidance for Emergency Facilities and Equipment, 07/30/93.

DOE EMG-HAZ, Guidance for Hazards Assessment, 06/26/92.

DOE EMG-N, Interim Guidance for Notification, 07/28/92.

DOE EMG-PA, Interim Guidance for Protective Actions, 06/01/93.

DOE EMG-R/R, Interim Guidance for Reentry and Recovery, 06/01/93.

DOE EMG-TRNG, Interim Guidance for Emergency Management Training, 07/28/92.

DOE/RL-91-28, Hanford Facility Dangerous Waste Permit Application, General Information, Rev 1, May 1993.

DOE/RL-91-28, Hanford Facility Contingency Plan, 05/28/93 Appendix 7A.

RIDs by Document X-Reference Listing
Based on 324-EM-SD RID and including all documents.

10 CFR 835, Occupational Radiation Protection, Dated 12-14-93

29 CFR 1910, Occupational Safety and Health Standards, Dated 07-01-95

40 CFR 355, Emergency Planning and Notification, Dated 07-01-95

DOE ORDER 5480.10, Contractor Industrial Hygiene Program

DOE ORDER 5482.1B, Environmental, Safety, and Health Appraisal Program, Revision C01

DOE ORDER 5500. 1B, Emergency Management System, Revision C01

DOE ORDER 5500. 2B, Emergency Categories, Classes, and Notification and Reporting, Revision C01

DOE ORDER 5500. 3A, Planning and Preparedness For Operational Emergencies, Revision C01

WAC 173-303, Dangerous Waste Regulations, Dated 11-01-95

WAC 296- 62, Occupational Health Standards -- Safety Standards for Carcinogens, Dated 09-12-94

***** End of RIDs by Document X-Reference Listing *****

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SAFEGUARDS AND SECURITY

6.0 Safeguards and Security

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract level S/RID.

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For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

Presently, the material control areas at the 324 building are categorized by DOE as Category IV-D/E. The Pacific Northwest National Laboratory (PNNL) will retain control of a vault in the 324 building that contains category III material. Because PNNL will retain control of this vault, category III material requirements will not be addressed in this document.

6.1 Management and Administration

REQUIREMENT SOURCE: SAS PHMC COM-STAT, Dated 03-02-97, Statement

It is intended that this Functional Area document be used as a baseline from which safety-related

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Safeguards and Security requirements can be identified. All Safeguards and Security orders and directives are identified in the PHMC contract and compliance is mandatory in accordance with that contract. Personnel will comply with all contractually imposed Safeguards and Security (SAS) requirements identified in orders and directives unless specifically exempted by DOE.

6.2 Personnel Security

Requirements applicable to this section are not safety-related and will not be incorporated into this document. All Safeguards and Security requirements that are not safety-related are identified in the PHMC contract and compliance is mandatory.

6.3 Protection Program Operations

REQUIREMENT SOURCE: DOE M 5632.1C-1, Chapter I, Section 1

SITE-SPECIFIC CHARACTERISTICS. Protection programs shall be tailored to address specific site characteristics and requirements, current technology, ongoing programs, operational needs, and to achieve acceptable protection levels that reduce inherent risks on a cost-effective basis.

REQUIREMENT SOURCE: DOE M 5632.1C-1, Chapter XIII, Section 2.a.(1)

Statutory and Regulatory Provisions. Title 10 Code of Federal Regulations Part 860 and Section 229 of the Atomic Energy Act of 1954, as amended, prohibits unauthorized entry upon and unauthorized carrying, transporting, or otherwise introducing or causing to be introduced any dangerous weapon, explosive, or other dangerous instrument or matter likely to produce substantial injury or damage to persons or property, into or upon any facility, installation, or real property subject to the jurisdiction, administration, or in the custody of the Department of Energy. The statute provides for posting of regulations and penalties for violations.

REQUIREMENT SOURCE: DOE-O-470.1, Revision Chg. 1, 06-21-96, Preamble 4.b.

Risk Management. The determination of the appropriate level of protection against risk shall consider the nature of the threat, the vulnerability of the potential target, and the potential consequences of an adversarial act. Accordingly, safeguards and security programs shall be based on vulnerability/risk analyses designed to provide graded protection in accordance with the asset's importance or the impact of its loss, destruction, or misuse. Risks to be accepted by the Department shall be identified and documented by vulnerability/risk analyses.

REQUIREMENT SOURCE: DOE-O-470.1, Revision Chg. 1, 06-21-96, Preamble 4.c. Paragraph 1

Graded Protection. By graded approach, DOE intends that the highest level of protection be given to security interests whose loss, theft, compromise, and/or unauthorized use will seriously affect

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the national security, and/or the health and safety of DOE and contractor employees, the public, the environment, or DOE programs. Protection of other interests shall be graded accordingly. Asset valuation, threat analysis, and vulnerability assessments shall be considered, along with the acceptable level of risk and any uncertainties, to decide how great is the risk and what protection measures are to be applied.

6.3.1 Physical Security

REQUIREMENT SOURCE: DOE M 5632.1C-1, Chapter VIII, Section 2.a.(8)

Panic hardware or emergency exit mechanisms used on emergency doors located in Security Areas shall be operable only from inside the perimeter and shall meet all applicable Life Safety Codes.

6.3.2 Security Systems

REQUIREMENT SOURCE: DOE-O-470.1, Revision Chg. 1, 06-21-96, Attachment 1, Preamble 5.a.

Standardization. Safeguards and security equipment and systems shall be selected on the basis of cost savings or other benefit to DOE such as worker safety, compliance with life safety codes, enhancing mission capability, and facilitating contingency efforts.

6.3.3 Protective Forces

Requirements associated with Protective Forces are applicable to the 324 building personnel, but are not cited in the Facility S/RID as implementation occurs through a FDH Contract level program by Hanford Patrol or the Benton County Sheriff's Department. Funding is provided by the 324 building personnel, via the FDH Contract wide support pool, to acquire the Protective Forces support required for its operations.

6.3.4 Security Identification Badges and Passes

Requirements applicable to this section are not safety-related and will not be incorporated into this document. All Safeguards and Security requirements that are not safety-related are identified in the PHMC contract and compliance is mandatory.

6.3.5 Incident Response and Management

Requirements applicable to this section are not safety-related and will not be incorporated into this document. All Safeguards and Security requirements that are not safety-related are identified in the PHMC contract and compliance is mandatory.

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6.3.6 Transportation Security

Requirements applicable to this section are not safety-related and will not be incorporated into this document. All Safeguards and Security requirements that are not safety-related are identified in the PHMC contract and compliance is mandatory.

6.4 Material Control and Accountability for Special Nuclear Material

Requirements applicable to this section are not safety-related and will not be incorporated into this document. All Safeguards and Security requirements that are not safety-related are identified in the PHMC contract and compliance is mandatory.

6.5 Facility Approvals, Security and Nuclear Material Surveys

The FDH Contract level Safeguards and Security organization holds primary responsibility for implementing the requirements of this subelement, but some facility participation may be required.

REQUIREMENT SOURCE: DOE-O-470.1, Revision Chg. 1, 06-21-96, Chapter IX, Section 1. and 2.

1. **POLICY/OBJECTIVES.** To ensure proper levels of protection consistent with Departmental standards to prevent unacceptable, adverse impact on national security or on the health and safety of DOE and contract employees, the public, or the environment are afforded safeguards and security activities. The adequacy of safeguards and security measures shall be validated through various means, such as:

- a. surveys conducted by the DOE Surveying Office prior to initiation of safeguards and security activities and periodically thereafter;
- b. periodic facility self-assessments;
- c. program reviews by Facility Survey Operations Managers and other appropriate Departmental Elements; and
- d. inspections and assessments by the Deputy Assistant Secretary for Independent Oversight and Appraisals.

2. **APPLICABILITY.** The Survey Program applies to all facilities that are eligible to have access to, use, store, or transmit nuclear and other hazardous material presenting a potential radiological or toxicological sabotage threat and/or classified information, that require access authorizations, or that possess over \$5,000,000 of DOE property, exclusive of facilities and land values.

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REQUIREMENT SOURCE: DOE-O-470.1, Revision Chg. 1, 06-21-96, Chapter V, Section 3.a. & b.

a. Nuclear and other hazardous materials presenting a potential radiological or toxicological sabotage threat, classified matter, and property protection interests shall not be permitted on premises occupied by the Department or its contractors until facility clearance is granted.

b. Safeguards and security activities involving access authorizations shall be registered to assist in ensuring proper levels of protection consistent with Departmental standards to prevent unacceptable, adverse impact on national security or on the health and safety of DOE and contractor employees, the public, or the environment.

6.6 Information Security Program

Requirements applicable to this section are not safety-related and will not be incorporated into this document. All Safeguards and Security requirements that are not safety-related are identified in the PHMC contract and compliance is mandatory.

6.7 Operations Security (OPSEC)

Requirements applicable to this section are not safety-related and will not be incorporated into this document. All Safeguards and Security requirements that are not safety-related are identified in the PHMC contract and compliance is mandatory.

6.8 Foreign Ownership, Control or Influence (FOCI)

Requirements applicable to this section are not safety-related and will not be incorporated into this document. All Safeguards and Security requirements that are not safety-related are identified in the PHMC contract and compliance is mandatory.

6.9 Evaluation of Radiological and Toxicological Sabotage Consequences

The FDH Contract level Safeguards and Security organization performs the evaluation of radiological and toxicological sabotage consequences with facility participation on the committee. The 324 Building management is responsible for identifying facility personnel to participate, providing the project funding, and implementing the identified protection strategies.

REQUIREMENT SOURCE: DOE-O-470.1, Revision Chg. 1, 06-21-96, Attachment 1, Chapter I, Section 2.c.(4)

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Programs shall be designed to mitigate the consequences of radiological/toxicological sabotage that would cause unacceptable impact to national security or pose significant dangers to the health and safety of employees, the public, or the environment.

REQUIREMENT SOURCE: DOE-O-470.1, Revision Chg. 1, 06-21-96, Attachment 1, Chapter I, Section 2.c.(7)

Security countermeasures to address bombings shall consider a range of activities from hand-carried, or mailed, to vehicle-transported devices.

REQUIREMENT SOURCE: DOE-O-470.1, Revision Chg. 1, 06-21-96, Chapter I, Section 3.b.

Threat. The "Design Basis Threat Policy for the Department of Energy (DOE) Programs and Facilities (U)" shall be used with local threat guidance and vulnerability assessments for protection and control program planning.

REQUIREMENT SOURCE: DOE-O-470.1, Revision Chg. 1, 06-21-96, Chapter I, Section 3.c.(1)(g)

Programs must be designed to prevent acts of radiological/toxicological sabotage that would cause unacceptable impact to national security or pose significant dangers to the health and safety of employees, the public, or the environment, and/or mitigate the consequences of acts of radiological/toxicological sabotage that would cause unacceptable impact to national security or pose significant dangers to the health and safety of employees, the public, or the environment.

REQUIREMENT SOURCE: RLID 473.1, Section 7.0 a., Paragraph 3.d:

(1) All RL contractors possessing hazardous materials in use or storage, including those contained in waste, shall perform graded assessments of the risk due to radiological/toxicological sabotage, consistent with the levels of hazards present within each facility.

(2) Threshold amounts are defined for radioactive materials in 10 CFR 30.72, Schedule C. Threshold quantities for non-radioactive materials are defined in 40 CFR Part 355, Appendix A. If threshold amounts are exceeded, as defined in these references, vulnerability assessments shall be performed. The result of these analyses shall be incorporated into the Hanford SSSP.

6.10 Key Interfaces

6.10.1 Emergency Management

The 324 building emergency management personnel develop facility specific emergency drills relative to security incidents.

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6.10.2 Packaging and Transportation

No key interfaces were identified in this area specific to the 324 building.

6.11 References

6.11.1 Requirement Source Documents

For references, see attached report titled "RIDs by Document X-Reference Listing".

6.11.2 Reviewed Documents Not Used as Requirement Sources

The following documents were reviewed as requirement sources but were not used in the development of this S/RID:

DOE O 471.1, Identification and Protection of Unclassified Controlled Nuclear Information.

DOE O 472.1, Personnel Security Activities.

DOE 1240.2B, Unclassified Visits and Assignments by Foreign Nationals.

DOE 1360.2B, Unclassified Computer Security Program.

DOE 5632.7A, Protective Force Program.

DOE 6430.1A, General Design Criteria.

RIDs by Document X-Reference Listing
Based on 324-SS-SD RID and including all documents.

DOE M 5632.1C-1, Manual for Protection and Control of Safeguards and Security Interests

DOE-O-470.1, Safeguards and Security Program, Revision Chg. 1, 06-21-96

RLID 473.1, Protection of Safeguards and Security Interests

SAS PHMC COM-STAT, SAS PHMC Compliance Statement, Dated 03-02-97

***** End of RIDs by Document X-Reference Listing *****

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7.0 Engineering Program

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements, applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a company-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The Engineering Program defined in this document is described in general accordance with the Environment, Safety, and Health Configuration Guide, Revision 0, dated July 30, 1993, and is presented in program elements and subelements. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

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This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract S/RID. For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

This Standards/Requirements Identification Document (S/RID) presents requirements applicable to the 324 Building and related structures. The Engineering Functional Area describes the programmatic controls, activities, personnel, and programs involved in executing Engineering activities, as such activities are included in the current mission of the facility. Element 7.4 was added to specify applied and considered references. Construction activities are governed by the Construction Program Functional Area.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

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7.1 Management and Administration

7.1.1 Program Policy and Procedures

Requirements for this subelement are included in the Management Systems Functional Area, subelements 1.1.1 and 1.2.

7.1.2 Authority and Responsibility

Requirements for this subelement are included in the Management Systems Functional Area, subelement 1.1.2.

7.1.3 Staffing and Training

For the training requirements applicable to the Engineering Program Functional Area, see the Postirradiation Testing Laboratory Building Training and Qualification Functional Area, subelements 4.3.1 and 4.3.6.

7.1.4 Planning

A requirement for this subelement is included in 7.1.5.

7.1.5 Scheduling

**REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Chapter III.F. 9.a.(2)
Sentence 1**

All the contractually authorized work shall be planned, scheduled, budgeted, and authorized by the contractor.

7.1.6 Cost Estimating

REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Chapter II.D.4.a.

When a cost estimate is prepared for a project, a description of the basis for the cost estimate shall be made and included in the estimate documentation.

7.1.7 Standards and Guides

**REQUIREMENT SOURCE: DOE ORDER 6430.1A, Division 1, Section 0109, Sentences 1
and 2**

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This section lists the reference standards and guides cited in these criteria. The latest edition of standards and guides shall be used.

REQUIREMENT SOURCE: DOE ORDER 6430.1A, Division 1, Section 0140[09]

Deviations from specified standards shall be identified and procedures established to ensure their control.

7.1.8 Engineering Assistance Request Process

Requirements for this subelement are included in the Management Systems Functional Area, subelement 1.2.

7.1.9 Testing Program

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(2)(iv)

Inspection and Acceptance Testing. Inspection and testing of specified items, services, and processes shall be conducted using established acceptance and performance criteria. Equipment used for inspections and tests shall be calibrated and maintained.

7.1.10 Construction Inspection

Requirements for this subelement are included in the Construction Program Functional Area Section 8.2.8.

7.2 Design

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(2)(ii)

Design. Items and processes shall be designed using sound engineering/scientific principles and appropriate standards. Design work, including changes, shall incorporate applicable requirements and design bases. Design interfaces shall be identified and controlled. The adequacy of design products shall be verified or validated by individuals or groups other than those who performed the work. Verification and validation work shall be completed before approval and implementation of the design.

7.2.1 Design Process

Requirements for this subelement are included in Section 7.2.

7.2.2 Design Criteria

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REQUIREMENT SOURCE: DOE ORDER 6430.1A, Division 1, Section 0101-1

Author's Note: The last sentence in paragraph 3 does not apply to the 324 Building.

These criteria provide mandatory, minimally acceptable requirements for facility design. The predominant model building code in the region shall govern on issues not covered in these criteria.

State, municipal, county, and other local building and zoning codes and ordinances should be reviewed for possible conflicts with these criteria. While it is not mandatory that DOE projects comply with such local codes and regulations, the design professional is encouraged to cooperate with local officials and DOE personnel to accommodate the intent of local codes and regulations as much as possible.

These criteria apply to any building acquisition, new facility, facility addition and alteration, and leased facility that is required to comply with DOE 4300.1B. This includes on-site constructed buildings, pre-engineered buildings, plant-fabricated modular buildings, and temporary facilities. For existing facilities, original design criteria apply to the structure in general; however, additions or modifications shall comply with this Order and the associated latest editions of the references herein. Reactors and their safety systems shall be sited and designed according to DOE 5480.6.

These criteria shall be applied in the planning, design, and development of specifications for facilities, including the preparation of site-specific general design criteria and project-specific design criteria during the project planning phase.

If there are any conflicts between these criteria and DOE directives, these criteria shall govern. Any such conflicts shall be brought to the attention of the Headquarters OPFM.

Information cited in these criteria as being provided by the cognizant DOE authority shall be obtained by the design professional through the designated cognizant DOE authority.

REQUIREMENT SOURCE: DOE ORDER 6430.1A, Division 1, Section 0101-2[03]

The contractor and/or DOE organizations responsible for facility projects shall review these criteria early in the planning phase and at later phases during the project construction process to determine if any of these criteria are not applicable or are not appropriate. The contractor shall document the criteria being used for each project in the project's SAR (per Section 0110-5.2, Safety Analysis) such that compliance with these criteria can be verified during design, construction, and facility operation. Site-specific criteria shall be included in this documentation.

7.2.3 Design Products

Requirements for this subelement are included in Section 7.2.

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7.2.4 Design Review and Verification

Requirements for this subelement are included in Section 7.2.

7.2.5 Design Change Controls

Requirements for this subelement are included in Section 7.2.

7.2.6 Design Life

Requirements for this subelement are included in Section 7.2.

7.3 Key Interfaces

INTERFACE BOUNDARIES

The Engineering Program Functional Area applies to all engineering activities at a facility. This functional area interfaces essentially with all other functional areas to some degree, in both programmatic and technical functional areas.

The following functional areas have a major interface with the Engineering Program Functional Area:

7.3.1 Management Systems

The Engineering Program uses applicable higher tier policies and procedures developed outside this functional area. Policies and procedures applicable solely to the Engineering Program Functional Area should exist within this functional area, but should be subject to general controls from the Management Systems Functional Area. Design-related needs for document control and records management should be contained in the Engineering Program Functional Area.

7.3.2 Quality Assurance

The QA Functional Area provides oversight of the conduct of the Engineering Program Functional Area. The Engineering Programs should ensure that appropriate QA controls are imposed on subcontractors and vendors. The Engineering Program Functional Area should incorporate into its processes a means of timely dispositioning of deficiencies whether identified by the QA function or through design verification and self-assessment activities. The Engineering Program Functional Area should also specify quality control inspection requirements for physical attributes important to design.

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7.3.3 Operations

The Operations Functional Area should provide operational mission and needs and capabilities to engineering for new design efforts. The Engineering Program provides information necessary to permit the Operations Functional Area to ensure operation of the facility within the limits imposed by the design. For example, the engineering design function must provide information on safety limits for equipment operation and provide inputs for use in operational activities such as instrument calibration and establishment of instrument setpoints. The system engineering function is within the scope of the Operations S/RID; however the Engineering Program S/RID includes requirements for obtaining system engineer input for design changes.

7.3.4 Maintenance

The interface between Engineering and Maintenance Program Functional Areas should be defined so that maintenance activities that change design features of facility components are treated as design changes and are subject to applicable design control requirements. Maintenance activities that maintain or restore the facility to its as-designed condition are solely within the Maintenance Functional Area. The Engineering Program Functional Area should provide post-maintenance testing requirements for work affecting the design and should develop technical requirements for materials and services used in maintenance activities that potentially affect the design. The Engineering Program should also provide maintenance with vendor instructions and recommendations obtained during the project construction phase.

This functional area identifies any construction activities that should be coordinated with the Engineering Program, in the event that such activities will be required in the future by the facility.

7.3.5 Construction Program

This functional area identifies any construction activities that should be coordinated with the Engineering Program, in the event that such activities will be required in the future by the facility.

7.3.6 Fire Protection

The interface between Engineering Program and Fire Protection Functional Areas is necessary because the Fire Protection Functional Area evaluates the fire hazards and

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defines the design features that are necessary to mitigate those hazards. The Engineering Program Functional Area ensures that those design features are incorporated into the design and provides the necessary support services (power, water, etc.) required by fire protection systems.

7.3.7 Nuclear Safety

The Nuclear Safety Functional Area contains the controls and requirements for SAR preparation, definition and analysis of credible accidents, and performing dose calculations needed for the SAR. The Engineering Program Functional Area recognizes the need for engineering support to this process and the need to ensure that designs are consistent with the SAR and other technical safety requirements and commitments.

7.3.8 Research and Development and Experimental Activities

This functional area does not include any applicable requirements.

7.3.9 Occupational Safety and Health

Public Law requires that this functional area be integrated into the design of facilities to ensure a safe working environment for operating personnel.

7.3.10 Waste Management

There is a series of Public Laws that affect design relating to this functional area. Their primary purpose is to manage and remediate waste as the releases to the environment are eliminated and to assure that the health of workers and the public is not compromised.

7.3.11 Environmental Protection

The Environmental Protection Functional Area interfaces with the Engineering Program in the areas of developing data necessary to the preparation of National Environmental Policy Act documents, licenses, and permits.

7.3.12 Configuration Management

The Engineering Program Functional Area provides information to the Configuration Management Functional Area and uses the design and configuration baselines maintained within that functional area.

7.3.13 Emergency Management

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The Engineering Program Functional Area incorporates into its designs the requirements necessary to support emergency preparedness and management functions. Such requirements include those necessary to perform safety-related functions under emergency conditions, as well as the capability to monitor facility conditions, and provide communications and other necessary support.

7.3.14 Radiation Protection

The Radiation Protection Functional Area provides design input regarding the radiation hazards associated with the processes being conducted within the facility. The Engineering Program Functional Area contains requirements for ensuring that appropriate design measures are taken to ensure compliance with radiation protection standards and requirements. The Radiation Protection Functional Area provides timely input to the design process by providing reviews of designs for compliance with radiation protection standards and requirements.

7.3.15 Training and Qualification

The Engineering Program Functional Area contains requirements for defining the training needs of personnel assigned to carry out the requirements contained therein. The Engineering Program is responsible for implementing the appropriate engineering-specific training and qualifications requirements. The Training and Qualification Functional Area defines the requirements for general employee training, security training, and instructor training and qualification.

7.4 References

7.4.1 Requirement Source Documents

See the attached "RIDS by Document X-Reference Listing" for the documents used as requirements sources in the development of this Functional Area.

7.4.2 Reviewed Documents Not Used as Requirement Sources

DOE Implementation Guide for 10 CFR 830.120, 08/94

DOE 5400.1, General Environmental Protection Program, Change 1, 06/29/90

DOE 5400.5, Radiation Protection of the Public and the Environment, Change 2, 01/07/93

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DOE 5480.4, Environmental Protection, Safety, and Health Protection Standards, 05/15/84

DOE 5480.19, Conduct Of Operations Requirements for DOE Facilities, Chg 1, 05/18/92

DOE 5700.6C, Quality Assurance, 08/21/91

DOE 5820.2A, Radioactive Waste Management, 09/26/88

DOE-STD-1073-93, Guide for Operational Configuration Management Program, 11/93

ASME NQA 1 1994, Quality Assurance Program Requirements for Nuclear Facility Applications, 1994

BMP 84-026, Setpoint Change Control Program, Revision 1, 06/86

BMP 85-013, Plant Modification Control Program, 05/85

BMP 90-009, Guidelines for the Conduct of Design Engineering, Revision 1, 02/92

ANSI N45.2.11, Quality Assurance Requirements for Design of Nuclear Power Plants, 1974

RIDs by Document X-Reference Listing
Based on 324-EN-SD RID and including all documents.

10 CFR 830, Nuclear Safety Management, Dated 04-05-94

DOE ORDER 4700.1, Project Management System, Revision C01

DOE ORDER 6430.1A, General Design Criteria

***** End of RIDs by Document X-Reference Listing *****

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8.0 Construction Program

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements, applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The Construction Program defined in this document is described in general accordance with the Environment, Safety, and Health Configuration Guide, Revision 0, dated July 30, 1993, and is presented in program elements and subelements. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

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This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract level S/RID. For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

This Standards/Requirements Identification Document (S/RID) presents requirements applicable to the 324 Building. The Construction Program Functional Area describes the programmatic controls, activities, personnel, and programs involved in executing Construction activities, as such activities are included in the current mission of the facility.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

8.1 Management and Administration

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8.1.1 Policies and Procedures

Author's Note: Additional requirements are contained in the Management Systems Functional Area, subelement 1.1.1.

**REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Chapter V.A.3.b.
Introduction**

Project Manager. The project manager has direct primary responsibility and accountability for the management of the construction effort. He or she normally will be designated as the contract administrator or contracting officer's technical representative for the construction effort by the contracting office. Among the usual functions of the project manager are the following:

REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Chapter V.A.3.b.(1)

Assures that cost, schedule, and scope requirements are met;

8.1.2 Authority and Responsibility

REQUIREMENT SOURCE: 10 CFR 830, Dated 04-05-94, Part 120(c)(2)(i)

Work Processes. Work shall be performed to established technical standards and administrative controls using approved instructions, procedures, or other appropriate means. Items shall be identified and controlled to ensure their proper use. Items shall be maintained to prevent their damage, loss, or deterioration. Equipment used for process monitoring or data collection shall be calibrated and maintained.

8.1.3 Staffing and Training

The comprehensive requirements for Training and Qualification programs are contained within that functional area in subelement 4.1.2.

8.2 Program Activities

Additional Requirements for this Element are included in Section 7.1 of the Engineering Functional Area.

REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Attachment III-7.2.a.(2)

The contractor's management control systems shall include policies, procedures, and methods which are designed to ensure that they will accomplish the following: Identify the internal organizational elements and the major subcontractors responsible for accomplishing the authorized work.

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REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Attachment III-7.2.a.(4)

The contractor's management control systems shall include policies, procedures, and methods which are designed to ensure that they will accomplish the following: Identify the managerial positions responsible for controlling overhead (indirect costs).

REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Attachment III-7.2.a.(5)

The contractor's management control systems shall include policies, procedures, and methods which are designed to ensure that they will accomplish the following: Provide for integration of the contract work breakdown structure with the contractor's functional organizational structure in a manner that permits cost and schedule performance measurement for contractor work breakdown structure and organizational elements.

8.2.1 Planning

REQUIREMENT SOURCE: DOE NOTICE 4700.5, Attachment 2, Section 2.a.(4)(b)1

Ensure that a process is established and is in operation throughout the project life to identify programmatic, operational, legislative, institutional, and other requirements or constraints, which may affect technical, cost, or schedule baselines and ensure that such baselines properly reflect such potential impacts.

REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Chapter V.A.2.c.(2)

General project management plans shall be prepared for categories or types of projects which are to be managed similarly, encompassing the same areas that the specific management plans address.

REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Chapter V.A.2.c.(3) [1]

Projects managed by general management plans shall have a specific document containing scope, estimate, schedule, and designated individuals assigned authorities and responsibilities.

8.2.2 Scheduling

REQUIREMENT SOURCE: DOE NOTICE 4700.5, Attachment 2, Section 2.a.(4)(b)2

Develop schedules that integrate with the WBS and cost estimate, and represent all work scope regardless of funding source. Use activity logic to depict all work scope, constraints, and decision points. Estimate and assign durations to activities representing work accomplishment.

REQUIREMENT SOURCE: DOE NOTICE 4700.5, Attachment 2, Section 2.a.(4)(b)3

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Establish an approved schedule baseline which clearly depicts critical path activities and milestones from which actual performance for all activities and milestones can be compared, and from which forecast data can be generated. Resource-load activities, as required and at the appropriate level, to develop time phased budgets that are integrated with the schedule. Permit only authorized changes to the schedule baseline.

8.2.3 Cost Estimating

REQUIREMENT SOURCE: DOE NOTICE 4700.5, Attachment 2, Section 2.a.(3)(b)1

Prepare cost estimates using appropriate estimating methodologies that are integrated with the WBS, and the DOE cost structure as specified by the DOE, for all contract work. Ensure that all estimates are consistent with DOE 5700.2D and in accordance with FAR 15.804, "Cost and Price Data Analysis, as applicable.

REQUIREMENT SOURCE: DOE ORDER 5700.2D, Preamble, Section 8.c.

All sequential cost estimates shall be reconciled and kept on file with previous estimates until the project is completed, thereby ensuring traceability from project start to completion. Each estimate documentation file shall also include the basis for the estimate, show how the estimate was performed, and contain a contingency analysis. All estimates shall be performed in constant-year dollars and then escalated into year-of-expenditure (generally fiscal year) dollars. Both the estimates and the escalation rates used will be kept on file until the project is completed.

8.2.4 Constructibility/Maintainability/Value Engineering

REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Chapter V.C.2.h.(2)(a) [4]

In adopting any new techniques or methods, care should be exercised to assure that the design criteria are satisfied, and that the results will be achieved without any decrease in desired quality and without any sacrifice in essential requirements.

8.2.5 Material and Equipment Storage

Requirements for this subelement are included in Section 8.1.2 and the Packaging and Transportation Functional Area, Section 13.2.6.

8.2.6 Contract Selection

Author's Note: Requirements for this section are included in the Engineering Functional Area, subelement 7.1.5.

8.2.7 Construction Program Controls

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REQUIREMENT SOURCE: DOE ORDER 1324.5B, Preamble, Section 8.c(1) and (2)

(1) Develop and implement a records management program consistent with the requirements of Federal law, Code of Federal Regulations, DOE directives, DOE guidelines, and Departmentally established or accepted referenced standards.

(2) Ensure that all records management program requirements are kept current and available for review.

REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Chapter V.C.2.h.(2)(d)1 [5]

Standard change controls procedures shall be established for projects not having specific project management plans.

REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Chapter V.C.2.h.(2)(d)1 [6]

These procedures shall include authorities and responsibilities for changes during both design and construction.

REQUIREMENT SOURCE: DOE ORDER 6430.1A, Division 1, Section 0150-4.1

General

Pollution and soil erosion controls shall be implemented during construction activities to mitigate impacts on air, water, and other environmental resources and to assure compliance with Federal, State, and local laws and regulations.

Site-specific industrial waste problems shall be considered prior to construction. Special construction permit and environmental protection requirements shall be addressed at a pre-bid conference and shall be clearly stated within the contract documents.

REQUIREMENT SOURCE: DOE ORDER 6430.1A, Division 1, Section 0150-5

TEMPORARY SECURITY FENCING

Prior to construction the following conditions and requirements for temporary security fencing shall be implemented:

- o Exclusion of unauthorized vehicular and pedestrian traffic from the construction site
- o Restriction of authorized vehicular traffic to designated access roads

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- o Protection of construction materials and installed work

Temporary security fencing shall be installed, as required, at unsecured construction sites to prevent vandalism or theft.

Temporary security fencing shall provide a level of integrity and a clear zone to suit site-specific conditions.

Temporary security fencing shall be consistent with site-specific security and protection goals and operational requirements.

8.2.8 Walkthroughs of Construction Sites

REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Chapter III, Section D.2.j

Inspection. Inspection methods of activities affecting quality should be established and executed by or for the organization performing the activity. The inspection should validate conformance with the prescribed documented instructions, procedures, and drawings. Examinations, measurements, or tests of material or products processed should be performed for each work operation, where necessary, to assure quality. If inspection of processed material or products is impossible or not advantageous, indirect control by monitoring processing methods, equipment, and personnel should be provided. Both inspection and process monitoring should be provided when control is inadequate without both. If mandatory inspection points which require witnessing or inspection by the contractor's designated representative, and if work cannot proceed beyond these points without the consent of its designated representative, the specific points should be indicated in appropriate documents.

REQUIREMENT SOURCE: DOE ORDER 4700.1, Revision C01, Chapter V.A.2.1. [1]

A comprehensive health and safety program must be established and utilized for all Departmental construction projects.

8.3 Key Interfaces

The Construction Program Functional Area interfaces to some degree with most other Functional Areas. Key interface areas are identified below.

8.3.1 Management Systems

The Construction Program interfaces with Management Systems primarily in the areas of policy and procedures development, organizational structure, assignment of authorities and responsibilities, and project control and reporting systems. DOE 4700.1 provides the

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major management requirements that interface and overlap between Management Systems and Construction Program management activities.

Requirements for Operational Readiness Reviews (ORR) are contained in the Management Systems Functional Area.

8.3.2 Quality Assurance

The Construction Program, working with the procurement staff, should implement the Quality Assurance Program through incorporation of appropriate quality assurance clauses in construction management and construction contracts, and monitoring construction operations to ensure performance in accordance with the contracts. A detailed description of the Quality Assurance requirements that interface with construction is found within the Quality Assurance Program Functional Area.

8.3.3 Configuration Management

The Construction Management Program interfaces with both this functional area and the Engineering Program to implement Configuration Management requirements for control of changes to the baseline technical scopes, schedules and estimates. A shared interface for overall document control exists among Construction, Quality Assurance, and Configuration Management.

8.3.4 Training and Qualification

The interface with this functional area is primarily in two areas: ensuring training of the Construction Program staff in the areas of construction management, government contracting including contract administration, and occupational safety and health; and in establishing and scheduling specific training and accrediting programs to ensure availability of adequate qualified construction craft personnel.

Due to a wide variety of special processes that may be part of a construction project, varying degrees of training and qualification may be required. Several of these areas have been included in this document, and provide examples of areas of interface.

8.3.5 Safeguards and Security

The interfaces in this area are in the areas of physical protection of construction materials and equipment, and prevention of construction contractor personnel intrusion into operating areas.

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8.3.6 Engineering Program

The Construction Program is responsible for implementing the Engineering Program's design drawings and specifications. Extensive interfacing should occur between the two, particularly for the following:

- Establishing cost estimates and schedules;
- Constructibility reviews;
- Establishing work packages for procurement;
- Control of scope, estimates and schedules;
- Permitting and licensing efforts;
- Review and approval of vendor drawings;
- Identifying laydown space and temporary utility needs;
- Construction inspection activities;
- Planning and execution of startup; and,
- Record maintenance, distribution and retention.

A principal interface occurs among engineering, construction, and Quality Assurance, wherein construction's nonconformances with engineering direction are identified, processed, and resolved.

8.3.7 Operations

The operations staff of the facility become the in-situ owners of the construction project on behalf of DOE. Therefore, the major interface is the operability testing and final acceptance of the constructed project.

8.3.8 Maintenance

The interface between Construction and Maintenance Programs may exist on many levels

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depending on the size and complexity of the project. Normal interfaces are in the areas of scheduling, temporary utilities, startup, and records maintenance, distribution and retention. Additionally, construction forces may be required to adopt and implement many of the Maintenance Program's functions in order to preserve and maintain systems, structures, components, tools, vehicles, and equipment either constructed or used in construction. Other interfaces may develop as systems, structures, or components are accepted by operations and maintenance from construction on an individual basis.

For construction items that are turned over, the interface is the transfer of responsibility and documentation for the particular item.

8.3.9 Radiation Protection

Interfacing with this functional area is primarily for personnel protection.

8.3.10 Fire Protection

Interfacing with this functional area is primarily for planning, installation and test of temporary and permanent fire protection systems. In all cases the fire protection requirements prescribed by the Fire Protection Program will be implemented by the Construction Program, as applicable.

8.3.11 Research and Development and Experimental Activities

Construction personnel will interface with research personnel through facility management for the purpose of scheduling activities to avoid interference with ongoing work.

8.3.12 Occupational Safety and Health

The Construction Program, working with the procurement staff, should implement OSHA through incorporation of appropriate clauses in construction management and construction contracts and, working with the construction inspector, should monitor construction operations to ensure contractor conformance to OSHA. The Construction Program also interfaces with OS&H in the area of personnel training.

8.3.13 Environmental Protection

The Construction Program interfaces with this functional area for permitting, licensing and pollution control activities.

8.4 References

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8.4.1 Requirement Source Documents

See the attached "RIDS by Document X-Reference Listing" for the documents used as requirements sources in the development of this Functional Area.

8.4.2 Reviewed Documents Not Used as Requirement Sources

Numerous documents were reviewed for applicability and inclusion into this functional area. These were not included because they were higher level requirements that had been integrated into referenced requirements, they were lower level requirements used during implementation, or they were found to be not applicable to this functional area. The documents reviewed are as follows:

29 CFR 1926, Safety and Health Regulation for Construction, Occupational Safety and Health Administration, U.S. Department of Labor, 07/01/93.

ACI SP-4-89, Formwork for Concrete, American Concrete Institute, Fifth Edition, 1989.

AISI WR 120, Wire Rope User's Manual, American Iron and Steel Institute, Second Edition, 1985.

ANSI/ASQC-C1-85, Specification of General Requirements for a Quality Assurance Program, American Society of Quality Control, 1985.

ASME B30 series, "Safety Standards for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings", American Society of Mechanical Engineers.

DOE Order 1300.2A, U.S. Department of Energy Technical Standards Program, U.S. Department of Energy, 05/19/92.

DOE Order 1324.5B, Records Management Program, U.S. Department of Energy, 04/30/96.

DOE Order 4010.1A, Value Engineering, U.S. Department of Energy, 05/14/92.

DOE Order 4200.1C, Competition in Contracting, U.S. Department of Energy, 1/09/87.

DOE Order 4300.1C, Real Property Management, U.S. Department of Energy, 06/28/92.

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DOE Order 4320.1B, Development Planning, U.S. Department of Energy, 01/07/91.

DOE Order 4700.3, General Plant Projects, U.S. Department of Energy, Change 1, 11/16/92.

DOE Order 5480.4, Environmental Protection, Safety, and Health Protection Standards, U.S. Department of Energy, 05/15/84.

DOE Order 5700.5A, Policy and Management Procedures for Financial Incentives Programs, U.S. Department of Energy, 06/08/92.

DOE Order 5700.6C, Quality Assurance, U.S. Department of Energy, 08/21/91.

DOE Order 5700.7C, Work Authorization System, U.S. Department of Energy, 05/18/92.

DOE/EH-0135, Performance Objectives and Criteria for Technical Safety Appraisals at Department of Energy, U.S. Department of Energy, 06/90.

DOE/MA-0040, Cost & Schedule Control Systems Criteria for Contract Performance Measurement Work Breakdown Schedule Guide, U.S. Department of Energy, 10/81.

DOE/MA-0046, Cost Estimating Manual, U.S. Department of Energy, 01/82.

DOE/MA-0063, Volume 1, Cost Guide (Economic Analysis), U.S. Department of Energy, 01/82.

DOE/MA-0063, Volume 2, Cost Guide (Standard Procedures for terminating Revenue Requirements), U.S. Department of Energy, 06/82.

DOE/MA-0063, Volume 3, Cost Guide (Cost Factors), U.S. Department of Energy, 04/82.

DOE/MA-0063, Volume 4, Cost Guide (Cost Data and Cost Estimating Relationships--CER), U.S. Department of Energy, 05/82.

DOE/MA-0063, Volume 5, Cost Guide (Construction of Economic Escalation Indices), U.S. Department of Energy, 05/82.

DOE/MA-0154, Acquisition Regulators Handbook - Source Evaluation, U.S. Department of Energy, 02/86.

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DOE/MA-0295, Work Breakdown Structure Guide, U.S. Department of Energy, 02/06/87.

FAR Part 48, Value Engineering, 04/01/84.

FAR Part 52.248, Value Engineering - Construction, 03/89.

Hanford Federal Facilities Agreement and Consent Order (Tri-Party Agreement), U.S. Department of Energy, Washington Department of Ecology, U.S. Environmental Protection Agency, 03/01/94.

ASME-NQA-1-1994, Quality Assurance Program Requirements for Nuclear Facilities, American Society of Mechanical Engineers, 07/24/94.

BMP 85-031, Guidelines for the Conduct of Technical Support Activities at Nuclear Power Stations, Institute of Nuclear Power Operations, Revision 2, 03/92.

BMP 86-023, Guidelines for Nuclear Power Plant Construction Projects, Institute of Nuclear Power Operations, 10/86.

NFPA 204M, Smoke and Heat Venting, National Fire Protection Association, 1991.

NFPA 241, Safeguarding Construction, Alteration, and Demolition Operations, National Fire Protection Association, 1993.

OMB Circular A-34, Instructions on Budget Execution.

OMB Circular A-109, Major System Acquisitions, 04/05/76.

OMB A-119, Use of Voluntary Standards, 01/17/80.

P.L. 95-507, Small Business Investment Act of 1977.

DOE-RL Order 4330.1, Maintenance of Property, U.S. Department of Energy, Richland, Change 1, 01/25/88.

WAC 296-24, General Safety and Health Standards, Washington Department of Labor and Industries, 12/31/92.

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WAC 296-155, Construction Safety, Washington Department of Labor and Industries,
12/31/92.

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Based on 324-CS-SD RID and including all documents.

10 CFR 830, Nuclear Safety Management, Dated 04-05-94

DOE NOTICE 4700.5, Project Control System Guidelines

DOE ORDER 1324.5B, Records Management Program

DOE ORDER 4700.1, Project Management System, Revision C01

DOE ORDER 5700.2D, Cost Estimating, Analysis, and Standardization

DOE ORDER 6430.1A, General Design Criteria

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9.0 Operations

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract site S/RID contains standards/requirements, applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The Operations Program defined in this document is described in general accordance with the Environment, Safety, and Health Configuration Guide, Revision 0, dated July 30, 1993, and is presented in program elements and subelements. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

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This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract S/RID. For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

9.1 Management

The 324 Building will comply with DOE Order 5480.19 utilizing a graded approach as outlined in the order.

REQUIREMENT SOURCE: DOE ORDER 5480.19, Revision C01, Preamble, Section 5.c.

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Author's Note: A Conduct of Operations Applicability Matrix will be prepared and sent to RL for approval by 06/30/97.

Conformance with the requirements of the Order shall be documented. However, it is not necessary to develop a separate manual or plan. As a minimum, a document (e.g., a matrix) shall be prepared in coordination with the Head of the Field Element and the cognizant Program Secretarial Official(s) that:

- (1) Indicates whether a specific guideline applies to a facility;
- (2) Indicates where and how each of the guidelines (Attachment I) of this Order are applied within the contractor's existing policies and procedures; and
- (3) Identifies any deviations or exemptions from the guidelines.

This document shall, as a minimum, be approved by the Head of the Field Element.

9.2 Key Interfaces

Because of the unique nature of operations, interfaces exist to some extent with each of the other Functional Areas. The proper management of these interfaces is critical to the success of Operations. The interfaces identified should be verified to have been adequately addressed.

9.2.1 Management Systems

Management Systems interface with Operations to provide the administrative programs and procedures that control the following:

- Policies and their related administrative procedures to provide the framework for promulgation of site and facility management controls.
- Operating and emergency procedures to ensure consistency in format content and use at all facilities.
- Operational records retention and storage requirements to incorporate federal, state, and company regulations for the types of records maintained.
- Occurrence investigation and reporting procedures to include DOE, state, and company requirements for identification, reporting, and investigating events.
- Operational Readiness Review Program to include requirements for readiness reviews

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of systems, components, and processes.

9.2.2 Quality Assurance

Quality Assurance interfaces with Operations to:

- Provide the requirements to be applied to activities that are important to quality as described in the FDH Quality Assurance Plan.
- Perform independent audits and surveillance of Operations activities, including Quality Control inspections.

9.2.3 Configuration Management

Configuration management interfaces with Operations to:

- Define, maintain, and distribute drawings and vendor material required to operate the facilities within ES&H guidelines.
- Establish a change control process to ensure normal and emergency procedures are maintained to current configuration and requirements.
- Provide verification and control of vendor related material required for Operations.
- Maintain and distribute safety analysis, including technical specifications and/or operational safety requirements.

9.2.4 Training and Qualification

Training and Qualification interfaces with Operations to:

- Establish the procedures and qualification requirements that control the training and/or selection of operations personnel.
- Develop and implement the training curricula and programs for Operations.
- Conduct management and supervisory training.
- Conduct personnel protection and safety training.

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- Provide for a Systematic Approach to Training to ensure the training programs adequately prepare operations personnel to perform their assigned tasks.

9.2.5 Emergency Management

Emergency Management interfaces with Operations to:

- Develop the facility Emergency Plans.
- Develop emergency response procedures for Operations.
- Participate in emergency drills as part of team training.
- Ensure communications systems are adequate.

9.2.6 Engineering Program

Engineering interfaces with Operations to:

- Provide safety analysis, technical requirements, limiting conditions for operations, and operational safety requirements to define the safety envelope.
- Ensure modifications are accomplished within an approved Change Control Program that provides for an Operational Readiness Review if required, as-built drawings and procedures, and approved vendor material.
- Provide direct day-to-day Engineering support.

9.2.7 Maintenance

Maintenance interfaces with Operations to:

- Provide a priority system for maintenance response to equipment problems affecting operations.
- Provide operations input to maintenance tasks to ensure personnel are aware of potential hazards.
- Obtain access to equipment in accordance with maintenance schedules.

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- Ensure equipment Lockout/Tagout as required to protect the health and safety of workers.
- Provide post maintenance tests requirements.

9.2.8 Radiation Protection

Radiation Protection interfaces with Operations to:

- Develop and implement programs and procedures for monitoring the radiation levels in the work place and in facility effluents.
- Develop and implement the operational procedures necessary to protect Operations personnel and the environment from exposure and uncontrolled releases.
- Define responsibility of Operations personnel to implement elements of the Radiation Protection Program, e.g., placement of step-off pads, conduct surveys, etc.
- Establish qualification or training requirements for operators conducting radiation program activities.

9.2.9 Research and Development and Experimental Activities

Facility operations are conducted per a facility use agreement. No interface exists with the R&D functional area document.

9.2.10 Nuclear Safety

Nuclear Safety interfaces with Operations to:

- Ensure Operations are conducted within the prescribed safety envelope through an established Unreviewed Safety Question Program applied to evolutions and procedure changes.
- Ensure appropriate nuclear safety requirements are incorporated into operating documents.

9.2.11 Occupational Safety and Health

Occupational Safety and Health interfaces with Operations to:

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- Develop the programs and implementing procedures for identification and mitigation of industrial safety hazards (including chemical and physical hazards), industrial hygiene, and medical evaluation and treatment.
- Establish qualification and training requirements for industrial safety practices.
- Provide the facility with detailed implementation requirements for a lockout/tagout program to protect personnel performing equipment servicing and maintenance.
- Provide medical examinations to prospective employees.
- Provide medical reexaminations for personnel in specific positions every two years and upon return to work following serious injury or illness preventing performance of their duties for more than one month.
- Ensure medical examinations meet applicable American National Standards Institute/American National Standard (ANSI/ANS) requirements.

9.2.12 Environmental Protection

Environmental Protection interfaces with Operations to:

- Ensure requirements are incorporated into operating procedures and other control documents.

9.2.13 Fire Protection

Fire Protection interfaces with Operations to:

- Establish the requirements for surveillance of fire protection equipment, such as fire extinguishers.
- Establish the requirements for fire prevention activities, such as proper storage and handling of flammable materials.
- Test emergency communication systems.
- Establish requirements for qualification and training of operations personnel for activities assigned under the Fire Protection Functional Area.

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9.2.14 Safeguards and Security

Safeguards and Security interfaces with Operations to:

- Determine operations specific responsibility for Safeguards and Security.
- Establish qualification and training requirements to carry out assigned responsibility.

9.2.15 Construction Program

Construction interfaces with Operations to:

- Establish procedures for testing and turnover of facilities and equipment.

9.2.16 Packaging and Transportation

- Define responsibility of Operations personnel to implement elements of the Packaging and Transportation Program.
- Establish qualification or training requirements for operators conducting program activities.

9.3 References

9.3.1 Requirement Source Documents

See the attached "RIDS by Document X-Reference Listing" for the documents used as requirements sources in the development of this Functional Area.

9.3.2 Reviewed Documents Not Used as Requirement Sources

Numerous documents were reviewed for applicability and inclusion into this functional area. These were not included because they were higher level requirements that had been integrated into referenced requirements, they were lower level requirements used during implementation, or they were found to be not applicable to this functional area. The documents reviewed are as follows:

29 CFR 1926, Safety and Health Regulation for Construction, Occupational Safety and Health Administration, U.S. Department of Labor, 07/01/93.

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ACI SP-4-89, Formwork for Concrete, American Concrete Institute, Fifth Edition, 1989.

AISI WR 120, Wire Rope User's Manual, American Iron and Steel Institute, Second Edition, 1985.

ANSI/ASQC-C1-85, Specification of General Requirements for a Quality Assurance Program, American Society of Quality Control, 1985.

ASME B30 series, "Safety Standards for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings", American Society of Mechanical Engineers.

DOE Order 1300.2A, U.S. Department of Energy Technical Standards Program, U.S. Department of Energy, 05/19/92.

DOE Order 1324.5B, Records Management Program, U.S. Department of Energy, 04/30/96.

DOE Order 4010.1A, Value Engineering, U.S. Department of Energy, 05/14/92.

DOE Order 4200.1C, Competition in Contracting, U.S. Department of Energy, 1/09/87.

DOE Order 4300.1C, Real Property Management, U.S. Department of Energy, 06/28/92.

DOE Order 4320.1B, Development Planning, U.S. Department of Energy, 01/07/91.

DOE Order 4700.3, General Plant Projects, U.S. Department of Energy, Change 1, 11/16/92.

DOE Order 5480.4, Environmental Protection, Safety, and Health Protection Standards, U.S. Department of Energy, Change 1, 05/16/88.

DOE Order 5700.5A, Policy and Management Procedures for Financial Incentives Programs, U.S. Department of Energy, 06/08/92.

DOE Order 5700.6C, Quality Assurance, U.S. Department of Energy, Change 1, 05/10/96.

DOE Order 5700.7C, Work Authorization System, U.S. Department of Energy, 05/18/92.

DOE/EH-0135, Performance Objectives and Criteria for Technical Safety Appraisals at

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Department of Energy, U.S. Department of Energy, 06/90.

DOE/MA-0040, Cost & Schedule Control Systems Criteria for Contract Performance Measurement Work Breakdown Schedule Guide, U.S. Department of Energy, 10/81.

DOE/MA-0046, Cost Estimating Manual, U.S. Department of Energy, 01/82.

DOE/MA-0063, Volume 1, Cost Guide (Economic Analysis), U.S. Department of Energy, 01/82.

DOE/MA-0063, Volume 2, Cost Guide (Standard Procedures for Determining Revenue Requirements), U.S. Department of Energy, 06/82.

DOE/MA-0063, Volume 3, Cost Guide (Cost Factors), U.S. Department of Energy, 04/82.

DOE/MA-0063, Volume 4, Cost Guide (Cost Data and Cost Estimating Relationships--CER), U.S. Department of Energy, 05/82.

DOE/MA-0063, Volume 5, Cost Guide (Construction of Economic Escalation Indices), U.S. Department of Energy, 05/82.

DOE/MA-0154, Acquisition Regulators Handbook - Source Evaluation, U.S. Department of Energy, 02/86.

DOE/MA-0295, Work Breakdown Structure Guide, U.S. Department of Energy, 02/06/87.

FAR Part 48, Value Engineering, 04/01/84.

FAR Part 52.248, Value Engineering - Construction, 03/89.

Hanford Federal Facilities Agreement and Consent Order (Tri-Party Agreement), U.S. Department of Energy, Washington Department of Ecology, U.S. Environmental Protection Agency, 03/01/94.

ASME-NQA-1-1994, Quality Assurance Program Requirements for Nuclear Facilities, American Society of Mechanical Engineers, 07/24/94.

BMP 85-031, Guidelines for the Conduct of Technical Support Activities at Nuclear Power

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Stations, Institute of Nuclear Power Operations, Revision 2, 03/92.

BMP 86-023, Guidelines for Nuclear Power Plant Construction Projects, Institute of Nuclear Power Operations, 10/86.

NFPA 204M, Smoke and Heat Venting, National Fire Protection Association, 1991.

NFPA 241, Safeguarding Construction, Alteration, and Demolition Operations, National Fire Protection Association, 1993.

OMB Circular A-34, Instructions on Budget Execution.

OMB Circular A-109, Major System Acquisitions, 04/05/76.

OMB A-119, Use of Voluntary Standards, 01/17/80.

P.L. 95-507, Small Business Investment Act of 1977.

WAC 296-24, General Safety and Health Standards, Washington Department of Labor and Industries, 12/31/92.

WAC 296-155, Construction Safety, Washington Department of Labor and Industries, 12/31/92.

RIDs by Document X-Reference Listing
Based on 324-OP-SD RID and including all documents.

DOE ORDER 5480.19, Conduct of Operations Requirements for DOE Facilities, Revision C01

***** End of RIDs by Document X-Reference Listing *****

324 Building

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10.0 Maintenance

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements, applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The Maintenance Program defined in this document is described in general accordance with the Environment, Safety, and Health Configuration Guide, Revision 0, dated July 30, 1993, and is presented in program elements and subelements. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

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This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract S/RID. For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

10.1 Program Management

REQUIREMENT SOURCE: DOE ORDER 4330.4B, Chapter II, Section 1, Paragraph 8, Sentence 2 and 3

The Introduction subsection briefly describes the objective to be achieved. Addressing each of the objectives is a requirement for an adequate maintenance program.

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REQUIREMENT SOURCE: DOE ORDER 4330.4B, Preamble, Section 10.a

Author's Note: A Maintenance Implementation Plan will be prepared and submitted to RL by 03/31/97.

Each DOE contractor in coordination with the appropriate field element shall develop, implement, and document a program in conformance with the policy and objectives of this Order in a Site Maintenance Plan (SMP) and/or a Maintenance Implementation Plan. An approved Maintenance Implementation Plan and the Program Implementation and Baseline Activities part of the SMP constitute agreements between the field element and the contractor on the implementation of the requirements of this Order. The program shall clearly define:

- (1) The structures, systems, and components included, using a graded approach and the requirements derived from Technical Safety Requirements.
- (2) The management systems used to control maintenance activities, including the means for monitoring and measuring the effectiveness of the program and the management of maintenance backlog.
- (3) The assignment of responsibilities and authority for all levels of the maintenance organization.
- (4) Mechanisms for feedback of relevant information, such as trend analysis and instrumentation performance/reliability data, to identify necessary program modifications.
- (5) Provisions for identification, evaluation, and correction of possible component, system design, quality assurance, or other relevant problems.
- (6) Performance indicators and criteria to be utilized to measure equipment, systems, and personnel effectiveness in maintenance activities.
- (7) Interfaces between maintenance and other organizations (i.e., operations, engineering, quality, training, environment, safety, and health).
- (8) A self-assessment program to monitor the effectiveness and efficiency of the maintenance program.
- (9) Provisions for planning, scheduling, and coordination of maintenance activities.

REQUIREMENT SOURCE: DOE ORDER 4330.4B, Preamble, Section 10.b, Sentence 1

Periodic inspections 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

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performance, safety, or facility preservation.

REQUIREMENT SOURCE: DOE ORDER 4330.4B, Preamble, Section 10.d, Sentence 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.

REQUIREMENT SOURCE: DOE ORDER 4330.4B, Preamble, Section 10.d, Sentence 3

For each DOE nuclear facility, the maintenance program shall be described in a Maintenance Implementation Plan, which addresses the 18 elements (excluding the introduction) in the sequence and format of Chapter II.

REQUIREMENT SOURCE: DOE ORDER 4330.4B, Preamble, Section 10.d, Sentence 5

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 Maintenance Implementation Plan with supporting rationale.

REQUIREMENT SOURCE: DOE ORDER 4330.4B, Preamble, Section 10.e

Maintenance Implementation Plans for nuclear facilities shall be submitted to the Managers of field elements for approval. For new nuclear facilities, Maintenance Implementation Plans shall be submitted 90 days prior to startup. Changes to Maintenance Implementation Plans shall be submitted and approved prior to implementation.

10.2 Key Interfaces

10.2.1 Configuration Management

Configuration Management ensures that safety-related drawings, flow control diagrams, electrical one-lines, instrumentation and Control schematics, etc., of critical structures, systems and components are controlled and reflect the current approved configuration/operational status. Maintenance should ensure that any activities that change the design of the facility are treated as design changes and are implemented using applicable design control and configuration management guidelines. Maintenance work request should be periodically reviewed to ensure that they are not used to implement facility design and configuration changes.

The requirements documents effecting configuration control are identified in the Engineering Functional Area of this S/RID.

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10.2.2 Engineering Program

Engineering provides the basis for maintenance of the facility through the issuance of equipment design/purchase specifications, drawings, change control documents and operational limits. Specific maintenance related guidance, recommended spare parts lists and preventive maintenance criteria are typically provided by equipment vendors. The design output and vendor supplied information are subsequently used to develop the facility specific maintenance, inspection, surveillance and testing procedures. Maintenance and Engineering have a critical interface on Post-Maintenance testing. Equipment testing requirements are normally issued as part of the original facility basis and subsequently modification work control packages. Feedback must be provided to Engineering on the adequacy or inadequacy of testing requirements. Maintenance must also have a continuous interface with Engineering and technical support functions in determining the cause of repetitive equipment failures and to investigate the root cause of unplanned events.

Requirements documents not covered by this Functional Area are addressed in the Engineering Functional Area of this S/RID.

10.2.3 Operations

All Maintenance activities on equipment that is important to safety, that affects operation or that changes control indications or alarms must be authorized by Operations. This authorization should be in writing on the document controlling the work. Maintenance is responsible for ensuring that documentation on the status of work in progress is available in the control area for review by Operations personnel.

Operations interface with Maintenance on Post-Maintenance and Post-Modification testing is also an important link to safe operation of the facility. Testing by maintenance personnel should include performance of all functions that may have been affected by the work. The testing should also verify the maintenance or modification performed served to correct the original problem and that no new problems were introduced. Any testing following maintenance should be specified on the maintenance work order other work authorizing document. The Operations supervisor ensures that testing appropriately proves equipment operability.

Interface actions not directly addressed in the Maintenance Functional Area are addressed in the Operations Functional Area of the S/RID.

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10.2.4 Quality Assurance

The Maintenance Organization is responsible for establishing and implementing a process to detect and prevent quality problems and to ensure quality improvement. Data on equipment reliability and performance, maintenance work process, personnel training and qualifications should be reviewed and analyzed to identify items and processes needing improvement. The elements of this quality improvement process are used as input to the facility Quality Assurance Program so that a method exists for providing continuous feedback on potential areas of improvement.

The Maintenance organization will also closely interface with Quality Assurance on procurement, inspection and testing to ensure that approved suppliers continue to provide acceptable parts and services, that processes are conducted using established acceptance and performance criteria and that equipment used for inspections and tests are properly calibrated and maintained. These interfaces should be defined in policy and facility level guidelines and procedures that control these activities.

10.2.5 Radiation Protection

The Radiation Protection Functional Area provides input into the Work Control portion of the Maintenance Functional Area regarding the requirements necessary to perform the maintenance task in a manner that is As Low As Reasonably Achievable (ALARA). The Maintenance Functional Area should establish controls to ensure that maintenance planning and the maintenance craft are integrated with the Radiation Protection activity to ensure that the maintenance task can be performed as planned and within the ALARA guidelines.

The primary personnel safety concerns affecting Maintenance activities are to ensure that radiation exposure levels are maintained in accordance with ALARA criteria. Maintenance interfaces with the Radiation Protection functional areas through the use of Radiation Work Permits and facility specific Radiation Protection training. Both of these areas incorporate ALARA criteria and guidelines but require feedback from Maintenance in order to be effective. Maintenance should interface with the Health Physics organization during facility condition inspections to assist in determining levels of radiation and determining areas and levels of surface and airborne contamination. Health Physics provides supporting services to Maintenance organization by measuring radiation exposures, incorporating ALARA criteria into work control documents and processes, and by specifying temporary shielding, protective clothing and respiratory protection required for maintenance activities in controlled areas.

10.2.6 Training and Qualification

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The Maintenance manager is responsible and accountable for determining the training and qualification needs of each individual in the maintenance organization. The Maintenance manager and supervisors should closely interface with the Training organization to establish and maintain course content, determine and support training schedules, accomplish on-the-job training (OJT) and provide feedback to adjust course content and emphasis. The Maintenance manager is also responsible for developing and maintaining appropriate personnel job descriptions.

The Training organization maintains existing programs, develops new training programs and presents the training using in-house personnel or vendor supplied personnel when appropriate. The Training organization should maintain maintenance training programs that meet the intent of established industrial guidelines and address specific facility needs. These training programs should be supported and guided by the Maintenance organization via periodic reviews. The Training organization is also responsible for developing and implementing performance-based training.

10.2.7 Occupational Safety and Health

The Maintenance organization interfaces with the Occupational Health and Safety (OSHA) functional areas by using and following industry accepted guidelines and practices covering a wide spectrum of personnel and equipment/ safety issues. These interfaces should be defined in the policy and facility level guidance and procedures that control the safety issues.

A shared responsibility exists between the Maintenance and Safety organizations to insure that work documents and activities are developed and conducted in accordance with OSHA criteria and guidelines. The areas that most affect the conduct of Maintenance are as follows:

1. Toxic and Hazardous Materials
2. Personal Protective Equipment
3. Materials Handling and Storage
4. Hand Held Equipment and Tools
5. Welding and Brazing
6. Hoisting and Rigging
7. Carcinogen Control
8. Medical and First Aid
9. Confined Space Entry
10. Powered Platforms and Lifts

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- 11. Electrical Safety
- 12. Health and Safety Training

10.3 References

10.3.1 Requirement Source Documents

In the course of this review the interpretive authority determined the DOE Order 4330.4B, "Maintenance Management Program" dated February 10, 1994, contained the necessary and sufficient requirements for the Maintenance Programs at Hanford Site. This document is current and is familiar to DOE facility personnel. Therefore this DOE Order has been used as the source of requirements for the 324 Building S/RID.

10.3.2 Reviewed Documents Not Used as Requirement Sources

The following documents were reviewed during the development of this S/RID. The interpretive authority determined that DOE 4330.4B adequately addressed the maintenance issues and that the documents listed below didn't offer any significant additional coverage of maintenance requirements. These documents do offer additional insights and guidance for implementation.

10 CFR 830.120, Quality Assurance, 5/4/94.

29 CFR 1910, OSHA, General Industry.

29 CFR 1926, OSHA, Construction.

WAC 173-303, Dangerous Waste Regulations.

DOE 5480.20A, Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Nuclear Facilities, 11/15/94.

DOE 5483.1A, Occupational Safety and Health Program, 6/22/83.

DOE 6430.1A, Design Criteria, 02/20/91.

BMP 83-025, MA-308 Unscheduled Outage Planning, 6/84.

BMP 85-032, Rev. 01, MA-30, Preventive Maintenance, 12/88.

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BMP 90-008, Maintenance Programs in the Nuclear Power Industry, 3/90.

BMP 92-001, Guidelines for the Conduct of Maintenance at Nuclear Power Stations, 4/92.

BMP TQ-501, Development and Implementation of On-The-Job Training Programs, 10/82.

DOE-STD-1050-93, Guidelines to Good Practices for Planning, Scheduling, and Control of Maintenance at DOE Nuclear Facilities, 3/93.

DOE-STD-1051-93, Guidelines to Good Practices for Maintenance Organization and Administration at DOE Nuclear Facilities, 3/93.

DOE-STD-1052-93, Guidelines to Good Practices for Types of Maintenance at DOE Nuclear Facilities, 3/93.

DOE-STD-1053-93, Guidelines to Good Practices for the Control of Maintenance Activities at DOE Nuclear Facilities, 3/93.

DOE-STD-1054-93, Guidelines to Good Practices for the Control and Calibration of Measuring and Test Equipment (M&TE) at DOE Nuclear Facilities, 3/93.

DOE-STD-1055-93, Guidelines to Good Practices for Maintenance Management Involvement at DOE Nuclear Facilities, 3/93.

RIDs by Document X-Reference Listing

Based on 324-MN-SD RID and including all documents.

DOE ORDER 4330.4B, Maintenance Management Program

***** End of RIDs by Document X-Reference Listing *****

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11.0 Radiation Protection

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract level S/RID.

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For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

The Waste Technology Engineering Laboratory will conduct radiological activities in accordance with the requirements of 10 CFR 835 by implementation of the DOE-approved FDHC 10 CFR 835 Radiation Protection Program and FDHC Radiological Control Manual Implementation Plan.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

11.1 Management

11.1.1 Exposure Reduction and ALARA

Although limiting contamination (Section 11.6, Contamination Control), the monitoring of radiation (Section 11.2, Facility Monitoring and Surveys) and Entry and Exit Control

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(Section 11.4, Access Controls) are also integral parts of the overall As-Low-As-Reasonably-Achievable (ALARA) program. Requirements relating to these specific subjects are included in the individual sections of the 324 Radiation Protection Functional Area.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 101

Author's Note: The Waste Technology Engineering Laboratory will conduct radiological activities in accordance with the requirements of 10 CFR 835 by implementation of the DOE-approved FDHC 10 CFR 835 Radiation Protection Program and FDHC Radiological Control Manual Implementation Plan.

Radiation protection programs.

- (a) A DOE activity shall be conducted in compliance with a documented radiation protection program (RPP) as approved by the DOE.
- (b) The DOE may direct or make modifications to a RPP.
- (c) The content of each RPP shall be commensurate with the nature of the activities performed and shall include formal plans and measures for applying the as low as reasonably achievable (ALARA) process to occupational exposure.
- (d) The RPP shall specify the existing and/or anticipated operational tasks that are intended to be within the scope of the RPP. Except as provided in §835.101(i), any task outside the scope of a RPP shall not be initiated until an update of the RPP is approved by DOE.
- (e) The content of the RPP shall address, but shall not necessarily be limited to each requirement in this part.
- (f) The RPP shall include plans, schedules, and other measures for achieving compliance with regulations of this part. Compliance with this part shall be achieved no later than January 1, 1996.
- (g) The RPP for an existing activity shall be submitted to DOE no later than January 1, 1995.
- (h) An update of the RPP shall be submitted to DOE:
 - (1) Whenever a change or an addition to the RPP is made;
 - (2) Prior to the initiation of a task not within the scope of the RPP; or
 - (3) Within 180 days of the effective date of any modifications to this part.
- (i) Changes additions, or updates to the RPP may become effective without prior Department approval only if the changes do not decrease the effectiveness of the RPP, and the RPP as changed, continues to meet the requirements of this part. Proposed changes that decrease the

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effectiveness of the RPP shall not be implemented without submittal to and approval by the Department.

(j) An initial RPP or an update shall be considered approved 180 days after its submission unless rejected by DOE at an earlier date.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 102

Internal audits. Internal audits of all functional elements of the radiation protection program shall be conducted no less frequently than every 3 years and shall include program content and implementation.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1001(a)

Measures shall be taken to maintain radiation exposure in controlled areas as low as is reasonably achievable through facility and equipment design and administrative control. The primary methods used shall be physical design features (e.g., confinement, ventilation, remote handling, and shielding). Administrative controls and procedural requirements shall be employed only as supplemental methods to control radiation exposure.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1001(b)

For specific activities where use of physical design features are demonstrated to be impractical, administrative controls and procedural requirements shall be used to maintain radiation exposures ALARA.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1003(a)

During routine operations, the combination of design features and administrative control procedures shall provide that:

- (1) The anticipated magnitude of the total effective dose equivalent shall not exceed 5 rems (0.05 sievert) in a year;
- (2) The anticipated magnitude of the committed dose equivalent to any organ or tissue, plus any deep dose equivalent from external exposure, shall not exceed 50 rems (0.5 sievert) in a year; and
- (3) Exposure levels are as low as reasonably achievable.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1003(b)

Compliance with the requirements in paragraph (a) of this section shall be demonstrated by appropriate monitoring pursuant to the provisions of subpart E.

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REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 1, Article 211.1

A DOE Administrative Control Level of 2,000 mrem per year per person is established for all DOE activities. Approval by the appropriate Secretarial Officer or designee shall be required prior to allowing a person to exceed 2,000 mrem.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 1, Article 211.2

An annual facility Administrative Control Level shall be established by the contractor senior site executive based upon an evaluation of historical and projected radiation exposures, work load and mission. The selection of the specific value shall be more restrictive than the DOE Administrative Control Level. This control level should be reevaluated annually. The choice of a low level for 1 year should not preclude choosing either a higher or lower level in a subsequent year.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 1, Article 211.3

For most facilities, an annual facility Administrative Control Level of 500 mrem or less should be challenging and achievable. An annual Administrative Control Level above 1,500 mrem is in most cases not sufficiently challenging to meet the goals of this Manual.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 1, Article 211.4

No person shall be allowed to go above the facility Administrative Control Level without the prior approval of the contractor senior site executive.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 1, Article 212.1

Lifetime Control Level

To administratively control a worker's lifetime occupational dose, Lifetime Control Level of N rem shall be established where N is the age of the person in years. Special Control Levels (Article 216) shall be established for personnel who have doses exceeding N rem.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 1, Article 212.2

The internal contribution to lifetime occupational dose from intakes prior to January 1, 1989, should be calculated in terms of either cumulative annual effective dose equivalent or committed effective dose equivalent. The internal contributions to lifetime occupational dose should continue to be reassessed as further bioassay results and improved methods for assessing internal dose become available.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 311

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**Planning Radiological Work
Requirements**

Technical requirements for the conduct of work, including construction, modifications, operations, maintenance and decommissioning, shall incorporate radiological criteria to ensure safety and maintain radiation exposures ALARA. The primary methods used to maintain exposures ALARA shall be facility and equipment design features. These features may be augmented by administrative and procedural requirements. To accomplish this, the design and planning processes should incorporate radiological considerations in the early planning stages. The checklist in Appendix 3A is helpful in reducing occupational radiation exposure.

11.1.1.1 Exposure Controls

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 314.1

Temporary Shielding

The installation, use and removal of temporary shielding should be controlled by procedure.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 314.2

The effects of the additional weight of temporary shielding on systems and components should be evaluated and established to be within the design basis prior to installation.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 314.3

Installed temporary shielding should be periodically inspected and surveyed to verify effectiveness and integrity.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 314.4

Radiation surveys should be performed during the alteration or removal of installed temporary shielding.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 314.5

Installed temporary shielding should be visibly marked or labeled with the following or equivalent wording: "Temporary Shielding - Do Not Remove Without Permission from Radiological Control."

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 314.6

Installed temporary shielding should be periodically evaluated to assess the need for its removal or replacement with permanent shielding.

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REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 342. 8

Where practicable, parts and components should be removed to areas with low dose rates to perform work.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 343.1

Logs and Communications

Radiological Control personnel should maintain logs to document radiological occurrences, status of work activities and other relevant information.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 343.3

Communication systems required by the Radiological Work Permit or technical work document should be checked for operability before being brought into the work area and periodically during work.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 343.4

Workers should keep Radiological Control personnel informed of the status of work activities that affect radiological conditions.

11.1.1.2 Exposure Control Requirements for Specific Work Activities

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 347.2

The following controls apply to localized benchtop and laboratory fume hood operations:

- a. Protective clothing shall, at a minimum, include lab coats and gloves. Gloves should be secured at the wrist as necessary.
- b. Shoecovers should be considered based on the potential for floor contamination;
- c. Workers should periodically monitor their hands during work;
- d. Upon completion of work or prior to leaving the area, workers shall monitor those areas of their body that are potentially contaminated. At a minimum, this includes hands, arms, and front portions of the body. Workers should perform a whole body frisk.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 347.3

The following controls apply to sample station operations:

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- a. Protective clothing shall, at a minimum, include labcoats and gloves. Gloves should be secured at the wrist as necessary;
- b. Shoecovers should be considered based on the potential for floor contamination;
- c. If there is a potential for splashing or airborne radioactivity, such as when taking pressurized samples, additional controls such as rubber aprons, face shields, full PCs, or respiratory protection should be instituted;
- d. Workers should periodically monitor their hands during work.
- e. Upon completion of work or prior to leaving the area, workers shall monitor those areas of their body that are potentially contaminated. At a minimum, this includes hands, arms, and front portions of the body. Workers should perform a whole body frisk.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 347.4

The following controls apply to glovebox operations:

- a. Gloveboxes should be inspected for integrity and operability prior to use;
- b. Gloveboxes should be marked with or survey measurements should be posted to identify whole body and extremity dose rates;
- c. Protective clothing shall, at a minimum, include labcoats and gloves. Gloves should be secured at the wrist as necessary;
- d. Shoecovers should be considered based on the potential for contamination;
- e. Workers should periodically monitor their hands during work;
- f. Upon completion of work or prior to leaving the area, workers shall monitor those areas of their body that are potentially contaminated. At a minimum, this includes hands, arms, and feet. Workers should perform a whole body frisk.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 6, Article 361.1

Primary emphasis shall be placed on engineered features to contain plutonium and to prevent airborne and surface contamination.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 6, Article 365.6

Safety devices and interlocks at fixed installations shall be operational prior to and during

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generation of a radiation field. Operational status shall be verified by testing.

11.1.1.3 Emergency Exposure Control Requirements

The Emergency Management Functional Area contains much more detailed and extensive requirements concerning emergency exposures. Although many of the activities associated with these requirements would be carried out by Radiation Protection personnel and Radiation Protection would have responsibilities for compliance with these requirements, emergency preparedness related requirements are included in the Emergency Management Functional Area as they are more closely associated with that subject.

11.1.1.4 Radiological Work Planning

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 312.1

Planning for Maintenance, Operations and Modifications
Maintenance and modification plans and procedures shall be reviewed to identify and incorporate radiological requirements, such as engineering controls and dose and contamination reduction considerations. Performance of this review is the responsibility of line management, with support and concurrence from the Radiological Control Organization.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 312.2

For routine tasks, such as surveillance, tours and minor non-radiological maintenance, performance of the above review and documentation of identified radiological requirements may be conducted as part of the Radiological Work Permit process (see Article 321).

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 315.1

Technical Work Documents

Technical work documents, such as procedures, work packages, or job or research plans, should be used to control hands-on work with radioactive materials. Technical work documents are not required for incidental or routine work activities that involve a low potential of worker exposure or workplace contamination, such as the collection of trash or used protective clothing.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 315.2

Technical work documents used to control radiological work activities should be reviewed and approved by the Radiological Control Organization.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 315.3

Radiological Control Hold Points should be incorporated into technical work documents for steps

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that require action by the Radiological Control Organization to prevent radiation exposures in excess of Administrative Control Levels, high airborne radioactivity concentrations, or the release of radioactivity to the environment.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 324.1

Pre-Job Briefings

At a minimum, pre-job briefings should be held prior to the conduct of work anticipated to exceed the trigger levels identified in Article 312.3.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 324.2

At a minimum, the pre-job briefing should include:

- a. Scope of work to be performed;
- b. Radiological conditions of the workplace;
- c. Procedural and RWP requirements;
- d. Special radiological control requirements;
- e. Radiologically limiting conditions, such as contamination or radiation levels that may void the RWP;
- f. Radiological Control Hold Points;
- g. Communications and coordination with other groups;
- h. Provisions for housekeeping and final cleanup;
- i. Emergency response provisions.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 324.3

Pre-job briefings should be conducted by the cognizant work supervisor.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 324.4

Workers and supervisors directly participating in the job, cognizant Radiological Control personnel, and representatives from involved support organizations should attend the briefing.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 324.5

A summary of topics discussed and attendance at the pre-job briefing should be documented. This documentation should be maintained with the technical work document.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 341.1

**Radiological Work Controls
Requirements**

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Radiological work activities shall be conducted as specified by the controlling technical work document and Radiological Work Permit.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 342. 6

The identity of components and systems should be verified prior to work.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 342. 7

Work activities and shift changes should be scheduled to prevent idle time in radiation areas.

11.1.1.5 ALARA Reviews

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 312.4

Tasks with the potential to exceed the above trigger levels shall undergo a formal, documented radiological or ALARA review. At a minimum, this review should consider the following:

- a. Inclusion of Radiological Control Hold Points in the technical work documents;
- b. Elimination or reduction of radioactivity through line flushing and decontamination;
- c. Use of work processes and special tooling to reduce time in the work area;
- d. Use of engineered controls to minimize the spread of contamination and generation of airborne radioactivity;
- e. Specification of special radiological training or monitoring requirements;
- f. Use of mock-ups for high exposure or complex tasks;
- g. Engineering, design and use of temporary shielding to reduce radiation levels;
- h. Walkdown or dry-run of the activity using applicable procedures;
- i. Staging and preparation of necessary materials and special tools;
- j. Maximization of prefabrication and shop work;
- k. Review of abnormal and emergency procedures and plans;
- l. Identification of points where signatures and second party or independent verifications are required;

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- m. Establishment of success or completion criteria, with contingency plans to anticipate difficulties;
- n. Development of a pre-job estimate of collective dose to be incurred for the job;
- o. Provisions for waste minimization and disposal.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 312.5

Radiological requirements identified as part of the above radiological review should be documented in the job plans, procedures or work packages.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 312.6

Radiological work anticipated to exceed individual or collective dose criteria established in the Site-Specific Radiological Control Manual should be reviewed and approved by the ALARA Committee.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 5, Article 352

Post-Job Reviews

Performance should be reviewed after completion of nonroutine radiological work. Requirements for post-job reviews should be delineated in the Site-Specific Radiological Control Manual.

Criteria established to trigger the conduct of a formal post-job review include:

- An actual collective dose equivalent of 5 person-rem or greater
- Actual doses for a task outside the range of $\pm 25\%$ of pre-job estimates
- Use of the stop radiological work authority
- A task results in a reportable radiological occurrence per DOE 5000.3B reporting criteria
- For identification of significant lessons learned.

11.1.1.6 Dose Tracking and Trending

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 344.3

During the performance of jobs for which a pre-job dose estimate was made, the Radiological Control Organization, in cooperation with line periodically monitor collective dose accumulation and management, should periodically monitor collective dose accumulation and compare it with the pre-job dose estimate. Differences should be reviewed to identify causes and assess the need for corrective actions.

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11.1.2 Radiation Protection Training

The Training and Qualification Functional Area is responsible for conducting training in accordance with requirements which ensure all training programs are developed and presented using established good training and qualification methods and processes. The 324 Facility's Radiological Control organization assists this process by interfacing with the training organization to ensure the proper job tasks are addressed.

11.1.3 Radiological Program Performance Goals

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 1, Part 2, Article 121.9

A performance indicator program for measuring and trending the effectiveness of the Radiological Control Program against predetermined goals should be established and maintained.

11.1.4 Program Policy and Procedures

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 501(d)

Administrative procedures shall be written as necessary to demonstrate compliance with the provisions of this section. These administrative procedures shall include actions essential to ensure the effectiveness and operability of barricades, devices, alarms, and locks. Authorizations shall be required to perform specific work within the area and shall include specific radiation protection measures.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 1, Part 2, Article 125.5

Managers, supervisors and workers should be involved in the development of accurate, clear, written procedures for performing radiological work. If during the use of procedures a written requirement cannot be responsibly followed, the work should be stopped and guidance obtained.

11.1.5 Policy for Response to Abnormal Situations

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1304(a)

Installations possessing sufficient quantities of fissile material to potentially constitute a critical mass, such that the excessive exposure of personnel to radiation from a nuclear accident is possible, shall provide nuclear accident dosimetry for those personnel.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1304(b)

Nuclear accident dosimetry shall include the following:

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- (1) A method to conduct initial screening of personnel involved in a nuclear accident to determine whether significant exposures to radiation occurred;
- (2) Methods and equipment for analysis of biological materials;
- (3) A system of fixed nuclear accident dosimeter units; and
- (4) Personal nuclear accident dosimeters worn by all personnel who enter locations in which installed criticality alarm systems are required.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 345.1

Stop Radiological Work Authority

Radiological Control Technicians and their supervisors, line supervision, and any worker through their supervisor has the authority and responsibility to stop radiological work activities for any of the following reasons:

- a. Inadequate radiological controls;
- b. Radiological controls not being implemented;
- c. Radiological Control Hold Point not being satisfied.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 345.3

Once radiological work has been stopped, it shall not be resumed until proper radiological control has been reestablished.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 345.4

Resumption of radiological work requires the approval of the line manager responsible for the work and the Radiological Control Manager.

11.1.6 Radiological Occurrences

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1301(b)

All exposures exceeding the limits specified in §§835.202 or 835.205 shall be recorded in the affected individual's occupational exposure file and reported to the DOE in accordance with Departmental requirements for occurrence reporting and processing.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1301(c)

When the conditions under which the emergency or accident exposures were received have been eliminated, operating management shall notify the Head of the responsible DOE field organization.

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REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1301(d)

Operations after an emergency or accidental exposure in excess of the limits specified in §§835.202 or 835.205 may be resumed only with the approval of the DOE.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1301(e)

Occurrence reports to DOE regarding emergencies and/or accidents shall be prepared and submitted in accordance with Departmental requirements for occurrence reporting and processing.

11.1.7 Records Management

The Records Management element includes requirements which are specific for the maintenance of 324 Radiation Protection records and for generating required Radiation Protection Reports. The Document Control and Records Management Functional Area under Management Systems provides overall requirements for maintaining records and the Document Control Organization will likely take responsibility for the long term handling and control of Radiation Protection records using the requirements contained in the Management Systems Functional Area. Additionally, there may be Document Control and Records Management requirements from the Management Systems Functional Area which Radiation Protection (and other functional areas) are responsible for complying with.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 701(a)

Records shall be maintained to document compliance with this part and with radiation protection programs required by §835.101.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 701(b)

Unless otherwise specified in this subpart, records shall be retained until final disposition is authorized by DOE.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 7, Part 1, Article 713.1

Recordkeeping Standards

Radiological control records shall be accurate and legible. The records should include the following:

- a. Identification of the facility, specific location, function and process;
- b. Signature or other identifying code of the preparer and date;
- c. Legible entries in black ink;

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- d. Corrections identified by a single line-out, initialed and dated;
- e. Supervisory signature to ensure review and proper completion of forms.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 7, Part 1, Article 713.3

Radiological control records should not include:

- a. Opaque substances for corrections;
- b. Shorthand or other nonstandardized terms.

11.1.7.1 Survey Records/Radiological Work Control Records

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 4

Radiological units.

Unless otherwise specified, the quantities used in the records required by this part shall be clearly indicated in special units of curie rad, or rem, including multiples and subdivisions of these units. The SI units, becquerel (Bq), gray (Gy), and sievert (Sv), are only provided parenthetically in this part for reference with scientific standards. These SI units are not authorized for use in records required under this part.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 703

The following information shall be documented and maintained:

- (a) Results of surveys for radiation and radioactive material in the workplace as required by §§835.401, 835.403, and 835.404;
- (b) Results of surveys, measurements, and calculations used to determine individual occupational exposure from external and internal sources;
- (c) Results of surveys for the release of material and equipment as required by § 835.1101(d); and
- (d) Results of maintenance and calibration performed on:
 - (1) Instruments used for area monitoring and contamination control as required by §835.401; and
 - (2) Devices used for individual monitoring as required by §§835.401 and 835.402.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 704(e)

Changes in equipment, techniques, and procedures used for monitoring in the workplace shall be

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documented.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 7, Part 5, Article 751.1

**Radiological Surveys
Requirements**

Radiological Control Programs require the performance of radiation, airborne radioactivity and contamination surveys to determine existing conditions in a given location. Maps with sufficient detail to permit identification of original survey and sampling locations should be maintained. Records shall contain sufficient detail to be meaningful even after the originator is no longer available. Radiological surveys should be recorded on appropriate standard forms and include the following common elements:

1. Date, time and purpose of the survey.
2. General and specific location of the survey.
3. Name and signature of the surveyor and analyst.
4. Pertinent information needed to interpret the survey results.
5. Reference to a specific Radiological Work Permit if the survey is performed to support the permit.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 7, Part 5, Article 753

Airborne Radioactivity

In addition to the elements provided in Article 751, records of airborne radioactivity shall include, at a minimum, the following information:

- a. Model and serial number of the sampler and laboratory counting instrument when available or unique identifier of each sampler and instrument.
- b. Location of fixed air samplers
- c. Location of portable air samplers used for a survey
- d. Air concentrations in general airborne areas and breathing zones
- e. Supporting parameters, including collection efficiency, flow rate, duration of sampling, correction factors and filter medium.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 7, Part 5, Article 754

Contamination Surveys

In addition to the elements required by Article 751, records of contamination surveys shall include, at a minimum, the following information:

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- a. Model and serial number of counting equipment.
- b. Contamination levels (using appropriate units) and appropriate supporting parameters including counting efficiency, counting time, correction factors, type of radiation and whether the contamination was fixed or removable.
- c. Location of areas found to contain hot particles or high concentrations of localized contamination.
- d. Follow-up survey results for decontamination processes cross-referenced to the original survey.

11.1.7.2 ALARA Review/Program Records

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 704(b)

Actions taken to maintain occupational exposures as low as reasonably achievable, including the actions required for this purpose by §§835.101, as well as facility design and control actions required by §§835.1001, 835.1002, and 835.1003, shall be documented.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 7, Part 4, Article 742

ALARA Records

Records of As-Low-As-Reasonably-Achievable (ALARA) plans and goals shall be maintained to demonstrate the adequacy of the ALARA Program. These records should include the minutes of ALARA committees and other committees where radiological safety issues are formally discussed.

11.1.7.3 Miscellaneous Radiation Protection Records

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 704(c)

Records shall be maintained to document the results of internal audits and other reviews of program content and implementation.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 704(d)

Written declarations of pregnancy shall be maintained.

11.2 Monitoring and Surveys

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 401(a)

Monitoring of individuals and areas shall be performed to:

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- (1) Demonstrate compliance with the regulations in this part;
- (2) Document radiological conditions in the workplace;
- (3) Detect changes in radiological conditions;
- (4) Detect the gradual buildup of radioactive material in the workplace; and
- (5) Verify the effectiveness of engineering and process controls in containing radioactive material and reducing radiation exposure.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 401(b)

Area monitoring in the workplace shall be routinely performed, as necessary, to identify and control potential sources of personnel exposure to radiation and/or radioactive material.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 401(c)

Instruments used for monitoring and contamination control shall be:

- (1) Periodically maintained and calibrated on an established frequency of at least once per year;
- (2) Appropriate for the type(s), levels, and energies of the radiation(s) encountered;
- (3) Appropriate for existing environmental conditions; and
- (4) Routinely tested for operability.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 5, Article 551. 5

Instruments used to perform radiation surveys shall be readily available and response-checked daily or prior to operation. When response checks are not within + 20 percent of the expected value, the instrument should be taken out of service. When response checks are not feasible, such as with instruments used to measure neutrons or tritium, compensatory actions should be established to ensure proper instrument performance.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 5, Article 555.7

The proper operation of continuous air monitoring equipment should be verified daily by performing an operational check. Operational checks should include positive air-flow indication, non-zero response to background activity, and internal check sources or 60 Hz electronic checks when available. Continuous air monitoring equipment should be verified weekly by checking for

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instrument response with a check source or with ambient levels of radon and thoron daughters.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 6, Article 562.5

Functional tests should be used to assess instrumentation designs that include alarms or that involve a process control. A functional test should be developed to test all components involved in an alarm or trip function and performed at least annually.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 6, Article 562.8

Instruments whose "as found" readings indicate that the instrument may have been used while out of calibration shall be reported to the Radiological Control Organization. The Radiological Control Organization should review surveys performed with the instrument while it was out of calibration.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 6, Article 563.3

Radiological instruments shall undergo calibration prior to use following any preventive or corrective maintenance or any adjustment that voids the previous calibration. A battery change is not normally considered maintenance.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 6, Article 564.1

Calibration facilities should perform inspections, calibrations, performance tests, calibration equipment selection and quality assurance in accordance with the recommendations of ANSI N323 and take the following actions:

- a. Locate activities in a manner to minimize radiation exposure to operating personnel and to personnel in adjacent areas;
- b. Minimize sources of interference, such as backscatter and non-ionizing radiation, during the calibration of instrumentation and correct for interferences as necessary;
- c. Operate in accordance with the referenced standards;
- d. Generate records of calibration, functional tests and maintenance in accordance with the referenced standards.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 6, Article 564.2

For organizations that do not possess or use their own calibration facilities, contracted calibration services should be performed in accordance with the referenced standards.

11.2.1 Radiation Monitors, Alarms and Surveys

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Requirements for this section are listed under sections 11.2.2 and 11.2.4.

11.2.2 Airborne Radioactivity Monitors, Alarms and Surveys

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Appendix A

Derived Air Concentrations (DAC) for Controlling Radiation Exposure to Workers at DOE Facilities

The derived air concentrations (DAC) for limiting radiation exposures through inhalation of radionuclides by workers are listed in this appendix. The values are based on either a stochastic (committed effective dose equivalent) dose limit of 5 rems (0.05 Sv) or a non-stochastic (organ) dose limit of 50 rems (0.5 Sv) per year, whichever is more limiting.

Note: The 15 rems [0.15 Sv] dose limit for the lens of the eye does not appear as a critical organ dose limit.)

The columns in this appendix contain the following information:

- (1) Radionuclide;
- (2) inhaled air DAC for lung retention class D, W, and Y in units of micro-Ci/ml;
- (3) inhaled air DAC for lung retention class D, W, and Y in units of Bq/m³; and,
- (4) an indication of whether or not the DAC for each class is controlled by the stochastic (effective dose equivalent) or nonstochastic (tissue) dose.

The classes D, W, and Y have been established to describe the clearance of inhaled radionuclides from the lung. This classification refers to the approximate length of retention in the pulmonary region. Thus, the range of half-times for retention in the pulmonary region is less than 10 days for class D (days), from 10 to 100 days for class W (weeks), and greater than 100 days for class Y (years). The DACs are listed by radionuclide, in order of increasing atomic mass, m and are based on the assumption that the particle size distribution of 1 micro- m is used. For situations where the particle size distribution is known to differ significantly from 1 micro- m , appropriate corrections can be made to both the estimated dose to workers and the DACs.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Appendix C [Restated]

The information for this table is found in 10 CFR 835.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 403(a)

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Measurements of radioactivity concentrations in the ambient air of the workplace shall be performed as follows:

- (1) Air sampling shall be performed in occupied areas where, under typical conditions, an individual is likely to receive an annual intake of 2 percent or more of the specified ALI values. For a given radionuclide and lung retention class, the ALI is the product of the DAC listed in appendix A of this part and the constant 2.4×10^{-9} ml[SIC]. Samples shall be taken as necessary to detect and evaluate the level or concentration of airborne radioactive material at work locations.
- (2) Real-time air monitoring, using continuous air monitors as defined in §835.2, shall be performed in normally occupied areas where an individual is likely to be exposed to a concentration of airborne radioactivity exceeding 1 DAC as specified in appendix A of this part or where there is a need to alert potentially exposed individuals to unexpected increases in airborne radioactivity levels.
- (3) For the airborne radioactive material that could be encountered, real-time air monitors shall have alarm capability and sufficient sensitivity to alert potentially exposed individuals that immediate action is necessary in order to minimize or terminate inhalation exposures.

11.2.3 Contamination Monitoring and Surveys

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 404(a)

Instruments and techniques used for radioactive contamination monitoring and control shall be adequate to ensure compliance with the requirements specified in this section.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 5, Article 554.1

Contamination Surveys

In addition to the requirements of Article 551, routine contamination surveys should be conducted in Radiological Buffer Areas established for the control of contamination and other areas with the potential for spread of contamination as follows:

- a. Prior to transfer of equipment and material from one Radiological Buffer Area to another;
- b. Prior to transfer of equipment and material from highly contaminated areas within Radiological Buffer Areas unless precautions such as bagging or wrapping are taken prior to transfer;
- c. Only, at contamination area control points, change areas, or step-off pads when in use, or per shift in high use situations;
- d. Daily, in office space located in Radiological Buffer Areas;

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- e. Daily, in lunch rooms or eating areas near Radiological Buffer Areas;
- f. Weekly, in routinely occupied Radiological Buffer Areas;
- g. Weekly, or upon entry if entries are less frequent, in areas where radioactive materials are handled or stored;
- h. Weekly, or upon entry if entries are less frequent, where contamination boundaries or postings are located;
- i. During initial entry into a known or suspected contamination area, periodically during work, at completion of job, or as specified in a Radiological Work Permit;
- j. After a leak or spill of radioactive materials.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 5, Article 554.3

Contamination surveys should incorporate techniques to detect both removable and fixed contamination.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 5, Article 554.6

Swipe surveys for removable contamination shall be reported in units of disintegrations per minute per 100 cm² (dpm/100 cm²). For swipe surveys of small items covering less than 100 cm², the results shall be reported in units of dpm per area swiped.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 5, Article 554.7

Large area wipes are encouraged and should be used to supplement standard swipe techniques in areas generally assumed not to be contaminated, such as entrances to Radiological Buffer Areas. If an evaluation indicates that an area wiped is contaminated, a thorough contamination swipe survey should be performed.

11.2.4 Dose Rate Surveys

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 403(b)

Monitoring of radiation in the workplace shall be performed using stationary (area) or portable radiation instruments, or a combination thereof. The instruments shall be readily available and shall be capable of measuring ambient radiation dose rates for the purpose of controlling radiation exposures.

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REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 5, Article 552.1

Radiation Exposure Surveys

In addition to the requirements of Article 551, routine radiation surveys should be performed in accordance with the following minimum frequencies:

- a. Daily, in office space located in Radiological Buffer Areas where the potential exists for external radiation exposure;
- b. Weekly, in routinely occupied Radiological Buffer Areas and Radiation Areas;
- c. Upon initial entry, weekly during continuing operations, and when levels are expected to change in High Radiation Areas;
- d. Weekly, for operating HEPA-filtered ventilation units;
- e. Weekly, for temporary Radiation Area boundaries to ensure that radiation areas do not extend beyond posted boundaries;
- f. Monthly, or upon entry, if entries are less frequent than monthly for Radioactive Material Areas;
- g. Monthly, for potentially contaminated ducts, piping and hoses in use outside radiological facilities.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 5, Article 552.2

Performance of radiation surveys should include dose rate measurements of the general area, dose rates at a distance of 30 centimeters from a source or surface of interest to evaluate potential whole body exposures, and dose rates on contact with potential sources of radiation where there is a potential for hands-on work.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 5, Article 552.3

Surveys should be conducted whenever operations are being performed that might result in personnel being exposed to small intense beams of radiation, such as those generated by shielded x-ray devices or due to removal or alteration of shielding.

11.3 Personnel Exposure Monitoring

11.3.1 Personnel Monitoring

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 402(a)

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For the purpose of monitoring individual exposures to external radiation, personnel dosimetry shall be provided to and used by:

- (1) Radiological workers who, under typical conditions, are likely to receive one or more of the following:
 - (i) An effective dose equivalent to the whole body of 0.1 rem (0.001 sievert) or more in a year;
 - (ii) A shallow dose equivalent to the skin or to any extremity of 5 rems (0.05 sievert) or more in a year;
 - (iii) A lens of the eye dose equivalent of 1.5 rems (0.015 sievert) or more in a year;
 - (iv) A deep dose equivalent from external exposures to any organ or tissue other than the lens of the eye of 5 rems (0.05 sievert);
- (2) Declared pregnant workers who are likely to receive from external sources a dose equivalent to the embryo/fetus in excess of 10 percent of the applicable limit in §835.206;
- (3) Minors and members of the public likely to receive, in 1 year, from external sources, a dose in excess of 50 percent of the applicable limits in §835.207 or §835.208, respectively; or
- (4) Individuals entering a high or very high radiation area.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 402(c)

For the purpose of monitoring individual exposures to internal radiation, internal dose evaluation programs (including routine bioassay programs) shall be conducted for:

- (1) Radiological workers who, under typical conditions, are likely to receive 0.1 rem (0.001 sievert) or more committed effective dose equivalent, and/or 5 rems (0.05 sievert) or more committed dose equivalent to any organ or tissue, from all occupational radionuclide intakes in a year;
- (2) Declared pregnant workers likely to receive an intake resulting in a dose equivalent to the embryo/fetus in excess of 10 percent of the limit stated in §835.206; or
- (3) Minors and members of the public who are likely to receive, in 1 year, an intake resulting in a committed effective dose equivalent in excess of 50 percent of the limits stated in §835.207 or §835.208, respectively.

11.3.2 Exposure Limits

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REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 202(a)

The occupational exposure to general employees resulting from DOE activities, other than planned special exposures under §835.204 and emergency exposure situations under §835.1302, shall be controlled so the following annual limits are not exceeded:

- (1) A total effective dose equivalent of 5 rems (0.05 sievert);
- (2) The sum of the deep dose equivalent for external exposures and the committed dose equivalent to any organ or tissue other than the lens of the eye of 50 rems (0.5 sievert);
- (3) A lens of the eye dose equivalent of 15 rems (0.15 sievert); and
- (4) A shallow dose equivalent of 50 rems (0.5 sievert) to the skin or to any extremity.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 204(a)

A planned special exposure may be authorized for a radiological worker to receive doses in addition to and accounted for separately from the doses received under the limits specified in §835.202(a), provided that each of the following conditions is satisfied:

- (1) The planned special exposure is considered only in an exceptional situation when alternatives that might prevent a radiological worker from exceeding the limit in §835.202(a)(1) are unavailable or impractical;
- (2) The contractor management (and employer, if the employer is not the contractor) specifically requests the planned special exposure, in writing; and
- (3) Joint written approval from the appropriate DOE Headquarters program office and the Assistant Secretary for Environment, Safety and Health is received.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 204(b)

Prior to requesting an individual to participate in an authorized planned special exposure, the individual's dose from all previous planned special exposures and all doses in excess of the occupational dose limits shall be determined.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 204(d)

Prior to a planned special exposure, written consent shall be obtained from each individual involved. Each individual shall be:

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- (1) Informed of the purpose of the planned operations and procedures to be used;
- (2) Informed of the estimated doses and associated potential risks and specific radiological conditions and other hazards which might be involved in performing the task; and
- (3) Instructed in the measures to be taken to keep the dose ALARA considering other risks that may be present.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 206(a)

The dose equivalent limit for the embryo/fetus from the period of conception to birth, as a result of occupational exposure of a declared pregnant worker, is 0.5 rem (0.005 sievert).

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 206(b)

Substantial variation above a uniform exposure rate that would satisfy the limits provided in §835.206(a) shall be avoided.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 206(c)

If the dose equivalent to the embryo/fetus is determined to have already exceeded 0.5 rem (0.005 sievert) by the time a worker declares her pregnancy, the declared pregnant worker shall not be assigned to tasks where additional occupational exposure is likely during the remaining gestation period.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 207

Any minor exposed to radiation and/or radioactive material during direct on-site access at a DOE site or facility shall not exceed 0.1 rem (0.001 sievert) total effective dose equivalent in a year.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 208

Any member of the public exposed to radiation and/or radioactive material during direct on-site access at a DOE site or facility shall not exceed 0.1 rem (0.001 sievert) total effective dose equivalent in a year.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 209(a)

The derived air concentration (DAC) values given in appendices A and C to this part shall be used in the control of occupational exposures to airborne radioactive material.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 209(b)

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With regard to inhalation exposures and external exposures from airborne radionuclides, compliance with this part shall be demonstrated through conformity with §835.101 and §835.202 which establishes the applicable regulatory limits.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1301(a)

A general employee whose occupational exposure has exceeded any of the limits specified in §§835.202 or 835.205 may be permitted to return to work in radiological areas during the current year providing that all of the following conditions are met:

- (1) Approval is first obtained from the contractor management and the Head of the responsible DOE field organization;
- (2) The individual receives counseling from radiological protection and medical personnel regarding the consequences of receiving additional occupational exposure during the year; and
- (3) The affected employee agrees to return to radiological work.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 1, Article 213.5

The radiological worker dose limits provided in Table 2-1 also apply to general employees. However, general employees who have not completed Radiological Worker I or II Training are not permitted unescorted access to any area in which they are expected to receive doses in excess of 100 mrem in one year. General employees who have not received Radiological Worker I or II training are not normally expected to exceed 100 mrem in a year.

11.3.3 Dosimetry Program

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 205(a)

Non-uniform exposures of the skin from X-rays, beta radiation, and/or radioactive material on the skin are to be assessed as specified in this section.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 205(b)

For purposes of demonstrating compliance with §835.202(a)(4), assessments shall be conducted as follows:

- (1) Area of skin irradiated is 100 cm^2 [SIC] or more. The non-uniform dose equivalent received during the year shall be averaged over the 100 cm^2 [SIC] of the skin receiving the maximum dose, added to any uniform dose equivalent also received by the skin, and recorded as the shallow dose equivalent to any extremity or skin for the year.

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(2) Area of skin irradiated is 10 cm^2 or more, but is less than 100 cm^2 . The non-uniform dose equivalent (H) to the irradiated area received during the year shall be added to any uniform dose equivalent also received by the skin, and recorded as the shallow dose equivalent to any extremity or skin for the year. H is the dose equivalent averaged over the 1 cm^2 of skin receiving the maximum absorbed dose, D, reduced by the fraction f, which is the irradiated area in cm^2 divided by 100 cm^2 (i.e., $H = fD$). In no case shall a value of f less than 0.1 be used.

(3) Area of skin irradiated is less than 10 cm^2 . The non-uniform dose equivalent shall be averaged over the 1 cm^2 of skin receiving the maximum dose. This dose equivalent shall:

- (i) Be recorded in the individual's occupational exposure history as a special entry; and
- (ii) Not be added to any other shallow dose equivalent to any extremity or skin recorded as the dose equivalent for the year.

11.3.4 Calculation Methods and Models

There are no requirements in this section which are directly related to the 324 Facility.

11.4 Radiological Area Access Control

11.4.1 Access Restrictions and Posting

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 404(e)

Entry control pursuant to §835.501 and posting pursuant to §835.603 are not required for areas with fixed contamination meeting the conditions of §835.404(d).

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 501(a)

Personnel entry control shall be maintained for each radiological area.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 501(b)

The degree of control shall be commensurate with existing and potential radiological hazards within the area.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 501(c)

One or more of the following methods shall be used to ensure control:

- (1) Signs and barricades;

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- (2) Control devices on entrances;
- (3) Conspicuous visual and/or audible alarms;
- (4) Locked entrance ways; or
- (5) Administrative controls.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 501(e)

No control(s) shall be installed at any radiological area exit that would prevent rapid evacuation of personnel under emergency conditions.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 502(a)

High radiation areas. One or more of the following features shall be used for each entrance or access point to a high radiation area where radiation levels exist such that an individual could exceed a deep dose equivalent to the whole body of 1 rem (0.01 sievert) in any one hour at 30 centimeters from the source or from any surface that the radiation penetrates:

- (1) A control device that prevents entry to the area when high radiation levels exist or upon entry causes the radiation level to be reduced below that level defining a high radiation area;
- (2) A device that functions automatically to prevent use or operation of the radiation source or field while personnel are in the area;
- (3) A control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the high radiation area and the supervisor of the activity are made aware of the entry;
- (4) Entryways that are locked. During periods when access to the area is required, positive control over each entry is maintained;
- (5) Continuous direct or electronic surveillance that is capable of preventing unauthorized entry;
- (6) A control device that will automatically generate audible and visual 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 activation of a secondary control device that will prevent use or operation of the source.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 502(b)

Very high radiation areas. In addition to the above requirements, additional measures shall be implemented to ensure individuals are not able to gain access to very high radiation areas when dose rates are in excess of the posting requirements of §835.603(c).

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REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 502(c)

No control(s) shall be established in a high or very high radiation area that would prevent rapid evacuation of personnel.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 601(a)

Working areas that require posting because of the presence, or potential presence, of radiation and/or radioactive material are delineated in the subsequent paragraphs of this section. Radioactive items or containers of radioactive materials, shall be individually labeled if adequate warning is not provided by control measures and required posting.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 601(b)

DOE approved signs, labels, and radiation symbols shall be used to identify areas specified in this subpart.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 601(c)

Required signs and labels shall have a yellow background. The radiation symbol shall be black or magenta.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 601(d)

Signs required by this subpart shall be clear and conspicuously posted and may include radiological protection instructions.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 602(a)

Each access point to a controlled area (as defined in §835.2) shall be posted, identifying it as a controlled area, whenever radioactive material and/or radiation fields which would require posting under §835.603 may be present in the area.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 603

Each access point to a radiological area (as defined in §835.2) shall be posted with conspicuous signs bearing the wording provided in this section.

(a) Radiation Area. The words "Caution, Radiation Area" shall be posted at any area accessible to individuals in which radiation levels could result in an individual receiving a deep dose equivalent in excess of 0.005 rem (0.05 millisievert) in 1 hour at 30 centimeters from the source or from any surface that the radiation penetrates.

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- (b) High Radiation Area. The words "Danger, High Radiation Area" shall be posted at any area accessible to individuals in which radiation levels could result in an individual receiving a deep dose equivalent in excess of 0.1 rem (0.001 sievert) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.
- (c) Very High Radiation Area. The words "Grave Danger, Very High Radiation Area" shall be posted at any area accessible to individuals in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 rads (5 grays) in one hour at 1 meter from the radiation source or from any surface that the radiation penetrates.
- (d) Airborne Radioactivity Area. The words "Caution, Airborne Radioactivity Area" shall be posted for any occupied area in which airborne radioactivity levels exceed, or are likely to exceed, 10 percent of the DAC value listed in appendix A or appendix C of this part.
- (e) Contamination Area. The words "Caution, Contamination Area" shall be posted where contamination levels exceed values listed in appendix D of this part, but are less than or equal to 100 times those values.
- (f) High Contamination Area. The words "Danger, High Contamination Area" shall be posted where contamination levels are greater than 100 times the values listed in appendix D of this part.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 3, Article 231

10 CFR 835.603 states: Each access point to a radiological area (as defined in §835.2) shall be posted with conspicuous signs bearing the wording provided in this section.

The DOE Radiological Control Manual is less restrictive in that it does not include the requirement to post each access point to a radiological area.

See Attachment 1 for complete text of 10 CFR 835.

1. Radiological posting shall be used to alert personnel to the presence of radiation and radioactive materials and to aid them in minimizing exposures and preventing the spread of contamination. Boundaries used for radiological control purposes are depicted in Figure 2-1.

H231.1 Hanford Site

Specifications and examples of signs and labels to be used are given in Appendix H2 D to ensure consistency throughout the Hanford Site. Revisions to signs related to radiological posting should be agreed to by the HRCF.

10 CFR 835.601(b) states:

- (b) DOE approved signs, labels, and radiation symbols shall be used to identify areas specified in

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10 CFR 835.

DOE approval of signs, labels, and radiation symbols is acquired through approval of a contractors Radiological Protection Program.

See Attachment 1 for complete text of 10 CFR 835.

2. Signs shall contain the standard radiation symbol colored magenta or black on a yellow background. Lettering shall be either magenta or black. Magenta is the preferred color over black. Standardized signs, as described in the standardized core training, shall be used where practicable.
3. Signs shall be conspicuously posted, clearly worded, and, where appropriate, may include radiological control instructions. Radiological postings should be displayed only to signify actual or potential radiological conditions. Signs used for training should be clearly marked, such as "For Training Purposes Only."
4. Posted areas should be as small as practicable for efficiency.
5. Postings should be maintained in a legible condition and updated based upon the results of the most recent surveys.
6. If more than one radiological condition (such as contamination and high radiation) exists in the same area, each condition should be identified.
7. In areas of ongoing work activities, the dose rate and contamination level or range of each should be included on or in conjunction with each posting as applicable.
8. Entrance points to areas of ongoing work activities controlled for radiological purposes should state basic entry requirements, such as dosimetry, Radiological Work Permit (RWP) and respirator required.
9. Rope, tape, chain and similar barriers used to designate the boundaries of posted areas should be yellow and magenta in color.
10. Physical barriers should be placed so that they are clearly visible from all directions and at various elevations. They should not be easily walked over or under, except at identified access points. These barriers shall be set up such that they do not impede the intended use of emergency exits or evacuation routes.
11. Posting of doors should be such that the postings remain visible when doors are open or closed.
12. A radiological posting that signifies the presence of an intermittent radiological condition

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should include a statement specifying when the radiation is present, such as "CAUTION: RADIATION AREA WHEN RED LIGHT IS ON."

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 3, Article 233, Introduction

A Radiological Buffer Area shall be established within the Controlled Area to provide secondary boundaries to minimize the spread of contamination and to limit doses to general employees who have not been trained as radiological workers. It is not expected that Radiological Buffer Areas will be established around inactive or secured Contamination Areas. The need for Radiological Buffer Areas in conjunction with Radioactive Material Areas should be evaluated.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 3, Article 233.1

The size of the Radiological Buffer Area should be commensurate with the potential for the spread of contamination outside Contamination, High Contamination and Airborne Radioactivity Areas. At a minimum, the Radiological Buffer Area should include the area adjacent to any exit from and entrance to Contamination, High Contamination and Airborne Radioactivity Areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 3, Article 233.2

A Radiological Buffer Area is not required for High Contamination Areas or Airborne Radioactivity Areas that are completely within Contamination Areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 3, Article 233.3

A Radiological Buffer Area established to limit exposure to external radiation should surround Radiation, High Radiation and Very High Radiation Areas. The boundary for the Radiological Buffer Area should be established to limit radiation doses to general employees to less than 100 mrem per year. Radiological Buffer Areas need not be posted for external exposure control if other posted boundaries provide equivalent employee protection.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 3, Article 233.4

Posting of Radiological Buffer Areas shall be in accordance with Article 231 and shall contain the wording "CAUTION, RADIOLOGICAL BUFFER AREA."

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 3, Article 236.1

Areas where radioactive materials are used, handled or stored should be posted "CAUTION, RADIOACTIVE MATERIAL." The posting shall meet the requirements in Article 231.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 3, Article 236.2

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Radioactive Material Areas should be located within Controlled Areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 3, Article 236.3

Radioactive Material Areas are not required when the radioactive material in any one location:

- a. Consists of ten or less sealed sources with half-lives less than 30 days or activities less than those specified in Table 1 of DOE N5400.9 (Extended by DOE N5400.10)
- b. Is inside a Contamination, High Contamination, or Airborne Radioactivity Area.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 3, Article 237.1

Underground Radioactive Material Areas shall be established to indicate the presence of underground items that contain radioactive materials such as pipelines, radioactive cribs, covered ponds, covered ditches, catch tanks, inactive burial grounds, and sites of known, covered, unplanned releases (spills).

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 3, Article 237.2

Underground Radioactive Material Area shall be posted "UNDERGROUND RADIOACTIVE MATERIAL." Posting should include instructions or special warnings to workers such as "Consult With Radiological Control Organization Before Digging" or "Subsurface Contamination Exists." The posting shall meet the applicable requirements of Article 231.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 3, Article 237.3

Underground Radioactive Material Areas may be located outside Controlled Areas unless access is likely to result in individual doses greater than 100 mrem/year in a year from underground radioactive material.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 334. 1

Radiation, High Radiation and Very High Radiation Areas
Minimum requirements for unescorted entry into Radiation Areas shall include the following:

- a. Radiological Worker I training;
- b. Worker's signature on the Radiological Work Permit (RWP), as applicable;
- c. Personnel dosimetry.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 334. 2

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Physical controls to prevent inadvertent or unauthorized access to High and Very High Radiation Areas shall be maintained in accordance with Appendix 3B.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 334. 3

Minimum requirements for unescorted entry into High Radiation Areas shall include the following:

- a. Radiological Worker II training (or Radiological Worker I with High/Very High Radiation Area access training in accordance with Article 632.5) and training in the use of a survey meter (or dose rate indicating device), as described in Article 126
- b. Worker's signature on the RWP;
- c. Personnel and supplemental dosimeters;
- d. Survey meter or dose rate indicating device available at the work area.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 334. 4

Minimum requirements for unescorted entry into High Radiation Areas where dose rates exist such that a worker could exceed a whole body dose of 1 rem in one hour shall include those items listed in Article 334.3 and the following:

- a. A determination of the worker's current exposure, based on primary and supplemental dosimeter readings;
- b. Pre-job briefing, as applicable;
- c. Review and determination by the Radiological Control Organization regarding the required level of Radiological Control Technician coverage.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 334. 5

Workers shall be prevented from entry to Very High Radiation Areas when the radiation source is exposed and very high radiation fields are present. In addition to the controls required in Articles 334.2 and 334.3, a survey shall be made prior to the first entry to the area after the source has been secured or shielded to verify the very high radiation field has been terminated.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 334. 6

Facility operations personnel should be notified prior to personnel entry to areas where operational or system changes made by operations personnel could result in significantly increased area dose rates.

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REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 334. 7

The number, issue and use of keys shall be strictly controlled where locked entryways are used to control access to High and Very High Radiation Areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 334. 8

The Radiological Control Organization should maintain an inventory of High and Very High Radiation Areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 334. 9

Weekly inspections of the physical access controls to High and Very High Radiation Areas should be made to verify controls are adequate to prevent unauthorized entry.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 335.5

Multiple step-off pads should be used at the exits from High Contamination Areas. Use of multiple step-off pads is described in Appendix 3C.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 336.1

Site procedures shall identify area entry requirements and access restrictions for visitors.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 336.2

Visitors with a demonstrated need to enter the following areas may be allowed access if such access is controlled with a combination of training and the use of escorts trained for the specific area:

- a. Radiological Buffer Areas;
- b. Radiation Areas;
- c. Contamination Areas;
- d. Radioactive Material Areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 336.3

Visitors shall be prevented from entering Very High Radiation Areas in accordance with Article 334.5 and should be prohibited access to High Radiation, High Contamination and Airborne Radioactivity Areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 5, Article 553.6

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Where an area radiation monitor is incorporated into a safety interlock system the circuitry shall be such that a failure of the monitor shall either prevent entry into the area or prevent operation of the radiation producing device.

11.4.2 Radiation Work Permits

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 322.1

Use of Radiological Work Permits
RWPs shall be used to control the following activities:

- a. Entry into High and Very High Radiation Areas;
- b. Entry into High Contamination Areas;
- c. Entry into Airborne Radioactivity Areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 322.2

RWPs should be used to control the following activities:

- a. Entry into Radiation Areas;
- b. Entry into Contamination Areas;
- c. Handling of materials with removable contamination that exceed the values of Table 2-2.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 322.3

Job-specific RWPs shall be used to control non-routine operations or work in areas with changing radiological conditions. The job-specific RWP shall remain in effect only for the duration of the job.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 322.4

General RWPs may be used to control routine or repetitive activities, such as tours and inspections or minor work activities, in areas with well-characterized and stable radiological conditions. General RWPs should not be approved for periods longer than 1 year.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 322.5

Radiological surveys shall be routinely reviewed to evaluate adequacy of RWP requirements. RWPs shall be updated if radiological conditions change to the extent that protective requirements need modification.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 322.6

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RWPs should be posted at the access point to the applicable radiological work area.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 322.7

Workers shall acknowledge by signature or through electronic means where automated access systems are in place that they have read, understand and will comply with the RWP prior to initial entry to the area and after any revisions to the RWP.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 322.8

Worker pocket or electronic dosimeter readings should be recorded in a format that identifies and provides linkage to the applicable RWP.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 322.9

An alternative formal mechanism, such as written procedures or experiment authorizations, may be used in lieu of an RWP as the administrative control over radiological work activities. If an alternative mechanism is used, it should meet the requirements of this Article and Articles 321 and 323.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 323.1

Radiological Work Permit Preparation

The responsibility for ensuring adequate planning and control of work activities resides with line management. The lead work group responsible for the planned activity or for the area should initiate the preparation of the RWP.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 323.2

RWPs shall be reviewed and approved by the Radiological Control Organization.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 323.3

The RWP shall be based on current radiological surveys and anticipated radiological conditions.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 323.4

The RWP shall be approved by the supervisor responsible for the work or area and the appropriate Radiological Control supervisor. Revisions or extensions to RWPs shall be subject to the same approval process.

11.5 Radioactive Materials Management

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11.5.1 Storage, Labels and Transportation

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 1, Article 411.2

Except for sealed and unsealed sources, radioactive material located within Contamination, High Contamination or Airborne Radioactivity Areas does not require specific labeling or packaging.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 1, Article 412.2

The following are not subject to labeling requirements:

- a. Radioactive material surveyed and determined to have contamination levels lower than Table 2-2 values;
- b. Radioactive material or containers packaged and labeled for off-site shipment in accordance with Department of Transportation Regulations;
- c. Personal Protective Equipment and clothing;
- d. Radiological control samples such as air, process and soil samples or swipes that are in the custody of Radiological Control personnel or personnel properly trained in the handling, packaging and transport of these samples;
- e. Equipment or installed system components undergoing maintenance covered by a Radiological Work Permit;
- f. Portable tools and equipment with fixed contamination permanently marked with yellow or magenta and maintained in a contaminated tool crib or storage and distribution area;
- h. Nuclear weapon components;
- i. Historical items, such as uranium hexafluoride cylinders and large items used in demonstration projects, located within a Radioactive Material Area; such items shall be properly labeled when they are removed from a Radioactive Material Area.
- j. Short-lived (half-life of 1 hour or less) radioactive material generated during an irradiation (i.e., research samples while an experiment is being conducted, etc.) that is immediately used.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 1, Article 414. 1

Radioactive Material Storage

Radioactive material should be stored in a designated Radioactive Material Area.

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REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 1, Article 414. 2

Long-term (more than 60 days) storage of radioactive material should be in a specially designated Radioactive Material Area.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 1, Article 414. 4

Each Radioactive Material Area should be approved by the Radiological Control Manager.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 1, Article 414. 5

A custodian should be assigned responsibility for each Radioactive Material Area. A custodian may have responsibility for more than one storage area.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 1, Article 414. 6

The custodian should conduct walkthroughs of Radioactive Material Areas to check container integrity.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 1, Article 414. 7

The custodian should conduct annual or more frequent reviews of each Radioactive Material Area, with emphasis on decontamination, movement of material to long-term storage locations and disposal of unneeded material.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 1, Article 414. 8

Storage of nonradioactive material in a Radioactive Material Area is discouraged.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 1, Article 414. 9

Outdoor storage of radioactive material is discouraged. In cases where outdoor storage is necessary, the integrity of containers used shall be ensured to prevent degradation from weathering and subsequent release of radioactive material. The custodian should check container integrity monthly at outdoor Radioactive Material Areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 1, Article 414.10

Radioactive material should be stored in a manner that reduces combustible loading. The use of cardboard containers for storage is discouraged.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 1, Article 414.11

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Flammable or combustible materials should not be stored adjacent to Radioactive Material Areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 1, Article 414.12

Fire protection measures, such as smoke detectors, water sprinklers and fire extinguishers, should be considered when establishing a Radioactive Material Area.

11.5.2 Movement and Release of Radioactive Material

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Appendix D

Surface Radioactivity Values
 Surface Radioactivity Values (note 1) in dpm/100 cm²

Nuclide	Removable (notes 2 + 4)	Total (Fixed + Removable) (notes 2 + 3)
U-nat, U-235, U-238, and associated decay products	1000	5000
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	20	500
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	200	1000
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above. (note 5)	1000	5000
Tritium Organic Compounds; surfaces contaminated by HT, HTO, and metal tritide aerosols	[Reserved]	[Reserved]

Note 1

The values in this appendix apply to radioactive contamination deposited on, but not incorporated into the interior of, the contaminated item. Where surface contamination by both alpha- and

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beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

Note 2

As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

Note 3

The levels may be averaged over one square meter provided the maximum surface activity in any area of 100 cm² is less than three times the value specified. For purposes of averaging, any square meter of surface shall be considered to be above the activity guide G if:

- (1) From measurements of a representative number n of sections it is determined that

$$\frac{1}{n} \sum_{i=1}^n Si \geq G$$

where Si is the dpm/100 cm² determined from measurement of section i ; or

- (2) it is determined that the sum of the activity of all isolated spots or particles in any 100 cm² area exceeds 3G.

Note 4

The amount of removable radioactive material per 100 cm² of surface area should be determined by swiping the area with dry filter or soft absorbent paper, applying moderate pressure, and then assessing the amount of radioactive material on the swipe with an appropriate instrument of known efficiency. (Note-- The use of dry material may not be appropriate for tritium.) When removable contamination on objects of surface area less than 100 cm² is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. Except for transuranics and Ra-228, Ac-227, Th-228, Th-230, Pa-231 and alpha emitters, it is not necessary to use swiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.

Note 5

This category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 1101

The following requirements apply for the release of materials and equipment from radiological

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areas for use in controlled areas:

- (a) In radiological areas established to control surface or airborne radioactive material, material and equipment shall be treated as radioactive material and shall not be released from radiological areas to controlled areas if either of the following conditions exist:
 - (1) Measurements of accessible surfaces show that either the total or removable contamination levels exceed the values specified in appendix D to this part; or
 - (2) Prior use suggests that the contamination levels on inaccessible surfaces are likely to exceed the values specified in appendix D to this part.
- (b) Material and equipment exceeding the total or removable contamination levels specified in appendix D to this part may be conditionally released for movement on-site from one radiological area for immediate placement in another radiological area only if appropriate monitoring and control procedures are established and exercised.
- (c) Material and equipment with fixed contamination levels that exceed the limits specified in appendix D to this part may be released for use in controlled areas outside of the radiological areas with the following provisions:
 - (1) Removable contamination levels are below the level specified in appendix D of this part; and
 - (2) Materials shall be routinely monitored, clearly labeled, or tagged to alert personnel of the contaminated status; appropriate administrative procedures shall be established and exercised to maintain control of these items.
- (d) The records for release of material and equipment shall describe the property, date on which the release survey was performed, identity of the individual who performed the survey, type and identification number of the survey instrument used, and results of the survey.

REQUIREMENT SOURCE: DOE ORDER 5400.5, Revision C02, Chapter II, Section 5.c, Items (1)-(4)

Release of Materials and Equipment.

- (1) **Surface Contamination Levels.** Prior to being released, property shall be surveyed to determine whether both removable and total surface contamination (including contamination present on and under any coating) is greater than the levels given in Figure IV-1 and that the contamination has been subjected to the ALARA process.
- (2) **Potential for Contamination.** 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

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are exposed to beams of particles capable of causing activation (neutrons, protons, etc.).

(3) Surveys. Surfaces of potentially contaminated property shall be surveyed using instruments and techniques appropriate for detecting the limits stated in Figure IV-1.

(4) Inaccessible Areas. Where potentially contaminated surfaces are not accessible for measurement (as in some pipes, drains, and ductwork), such property may be released after case-by-case evaluation and documentation based on both the history of its use and available measurements demonstrate that the unsurveyable surfaces are likely to be within the limits given in Figure IV-1.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 2, Article 422.1

Release to Uncontrolled Areas

Material in Controlled Areas or Radioactive Material Areas, documented to have been released from Contamination, High Contamination, or Airborne Radioactivity Areas, shall be surveyed prior to release to uncontrolled areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 2, Article 422.2

DOE 5400.5 describes radiological criteria for releasing material to uncontrolled areas. Material being released shall also be evaluated for internal contamination and contamination under any coatings.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 2, Article 422.3

DOE 5400.5 describes criteria for releasing radioactive material that has been contaminated in depth or volume, such as activated material or smelted contaminated material.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 2, Article 422.4

Material not immediately released after survey shall be controlled to prevent contamination while awaiting release.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 2, Article 422.5

Radiological labeling shall be removed from or defaced on material prior to release for unrestricted use.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 3, Article 431.3

Receipt surveys of radiological material shipments shall be performed by the Radiological Control Organization.

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REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 5, Article 554.2

Surveys for the release of radioactive materials shall be conducted in accordance with Articles 421 and 422.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 5, Article 554.4

Items with inaccessible surfaces which were located in known or suspected contamination areas and had the potential to become contaminated at levels likely to exceed Table 2-2 values shall be treated as potentially contaminated and subject to administrative controls unless the items are dismantled and monitored or special survey techniques are used to survey all surfaces.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 5, Article 554.5

The requirements for assessing representative samples of bulk material, such as sand, sweeping compounds or plate steel, which are not suitable for normal loose and fixed contamination-level assessment techniques, are specified in DOE 5400.5.

11.5.3 Specific Nuclide Control

This subelement also includes requirements for controlling "Hot Particles" (high specific activity individual radioactive particles) which may be encountered at the facility.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 348.1

The Site-Specific Radiological Control Manual should define hot particles, such as those capable of producing a shallow dose equivalent greater than 100 mrem in one hour, specific to facility operations and source terms.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 348.2

Measures for controlling hot particles, as identified in items 3 through 7 of this Article, should be implemented under the following conditions:

- a. Upon identification of hot particles;
- b. During new or non-routine operations with a high potential for hot particles, based on previous history;
- c. Upon direction of the Radiological Control Organization.

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REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 348.3

Areas or operations with the potential for hot particle contamination should be surveyed in accordance with Article 554.7.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 348.4

Contamination Area posting should be annotated to specifically identify the presence of hot particles.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 348.5

Access to hot particle areas should be controlled by a job-specific RWP. The following controls should be considered for inclusion on the RWP:

- a. Periodic personnel monitoring during the work activity, at a frequency based on the potential magnitude of skin exposure;
- b. Additional Personal Protective Equipment and clothing;
- c. Direct Radiological Control coverage during work or assistance during protective clothing removal;
- d. Use of sticky pads or multiple step-off pads.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 348.6

Personal Protective Equipment and clothing used in hot particle areas should be segregated from other radiological protective equipment and clothing during laundering and surveyed prior to reuse.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 348.7

Response to hot particle skin contamination of personnel should include the following:

- a. Immediate removal and retention of the hot particle for subsequent analysis;
- b. Analysis of the particle;
- c. Assessment of worker dose;
- d. Evaluation of work control adequacy.

11.5.4 Sealed Source Management

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 3, Article 431.1

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DOE N 5400.9 (extended by DOE N 5400.10) describes how sealed radioactive sources shall be controlled and maintained, and specifies requirements for receipt, inventory, storage, transfer, disposal and integrity testing. Unsealed sources shall be controlled and maintained in a similar manner except for integrity testing.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 3, Article 431.2

Procurement of radioactive sources shall be coordinated with the Radiological Control Organization.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 3, Article 431.4

Radioactive sources, including radiography sources, shall not be brought on-site by external organizations without the prior written approval of the Radiological Control Organization.

11.6 Contamination Control

11.6.1 Personnel, Equipment and Area Contamination Control

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 6, Article 464.1

Vacuum cleaners and portable air-handling equipment used in areas established to control removable surface contamination or airborne radioactivity (except areas where only tritium is present) shall be equipped with High-Efficiency Particulate Air (HEPA) filters. If the material to be vacuumed is wet enough to preclude resuspension, then HEPA filters are not necessary.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 6, Article 464.2

ANSI/UL 586 provides HEPA filter integrity testing criteria. Vacuum cleaner and portable air-handling equipment HEPA filters shall be integrity tested prior to initial use, when units have been opened, and annually.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 6, Article 464.3

Vacuum cleaners used for radiological work shall be:

- a. Uniquely marked and labeled;
- b. Controlled by an RWP;
- c. Controlled to prevent unauthorized use;
- d. Designed to ensure HEPA filter integrity under conditions of use;
- e. Designed to prevent unauthorized or accidental access to the inner surfaces of the vacuum.

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11.6.1.1 Personnel Contamination Monitoring

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 404(f)

Appropriate monitoring to detect and prevent the spread of contamination shall be performed by individuals exiting radiological areas established to control removable contamination and/or airborne radioactivity.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 338.1

Monitoring for Personnel Contamination
Personnel shall perform a whole body frisk under the following conditions:

- a. Immediately upon entry into an uncontaminated area after exiting Contamination Areas, High Contamination Areas and Airborne Radioactivity Areas;
- b. As directed by the RWP or the Radiological Control Organization.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 338.2

In addition to the above, personnel exiting a Radiological Buffer Area containing Contamination, High Contamination or Airborne Radioactivity Areas should, at a minimum, perform a hand and foot frisk. This frisk is optional if the Radiological Buffer Area exit is immediately adjacent to the location where the exiting worker has already performed a whole body frisk.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 338.3

Where frisking cannot be performed at the exit from Contamination Areas, High Contamination Areas or Airborne Radioactivity Areas due to high background radiation levels, personnel shall:

- a. Remove all protective equipment and clothing at the exit;
- b. Proceed directly to the nearest designated monitoring station;
- c. Conduct a whole body frisk.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 338.4

Personnel frisking shall be performed after removal of protective clothing and prior to washing or showering.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 338.5

Personnel frisking shall be performed using instruments that meet the minimum detection requirements of Article 221.2. Guidelines for personnel frisking are provided in Appendix 3D.

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REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 338.7

Personal items, such as notebooks, papers and flashlights, shall be subject to the same frisking requirements as the person carrying them.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 338.8

Instructions for personnel frisking should be posted adjacent to personnel frisking instruments or monitors.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 4, Article 541.2

When personnel detect skin contamination, they shall notify the Radiological Control Organization.

11.6.1.2 Personnel Contamination Control

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 404(g)

Protective clothing shall be required for entry to areas in which removable contamination exists at levels exceeding those specified in appendix D to this part.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 342.11

To minimize intakes of radioactive material by personnel, smoking, eating, or chewing shall not be permitted in Contamination, High Contamination or Airborne Radioactivity Areas. When a potential exists for personnel heat stress, drinking may be permitted within a Contamination Area under the following conditions and controls:

- a. The potential for heat stress cannot be reduced by the use of administrative or engineering controls;
- b. All drinking is from approved containers or sources;
- c. At a minimum, worker's hands and faces are monitored for contamination prior to drinking.
- d. Participating workers are monitored as part of the bioassay program.
- e. The applicable requirements and controls are described in approved procedures.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 4, Article 542.1

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Contaminated Wounds

Emergency medical care should be administered immediately for injuries involving radioactive materials in accordance with National Council on Radiation Protection and Measurements Report Number 65. Medical treatment of injuries takes precedence over radiological considerations.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 4, Article 542.2

The treatment of contaminated injuries should include the following:

- a. Treatment of contaminated wounds by medically qualified personnel;
- b. Monitoring of wounds and associated bandages for contamination, including alpha emitters if applicable;
- c. Identification of the radionuclides involved;
- d. Medical determination of the need for therapeutic intervention such as blocking or chelating agents;
- e. Initiation of appropriate bioassay monitoring;
- f. Determination of need for work restrictions.

11.6.1.3 Equipment and Area Contamination Control

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 404(b)

Appropriate controls shall be maintained and verified which prevent the inadvertent transfer of removable contamination to locations outside of radiological areas under normal operating conditions.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 404(c)

Any area in which contamination levels exceed the values specified in appendix D of this part shall be:

- (1) Posted in accordance with §835.603; and
- (2) Controlled in a manner commensurate with the physical and chemical characteristics of the contaminant, the radionuclides present, and the fixed and removable contamination levels.

REQUIREMENT SOURCE: 10 CFR 835, Dated 12-14-93, Part 404(d)

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Areas with fixed contamination exceeding the total radioactivity values specified in appendix D of this part may be located outside of radiological areas provided the following conditions are met:

- (1) Removable contamination levels are below the levels specified in appendix D of this part;
- (2) Unrestricted access to the area is not likely to cause any individual to receive a total effective dose equivalent in excess of 0.1 rem (0.001 sievert) in a year;
- (3) The area is routinely monitored;
- (4) The area is clearly marked to alert personnel of the contaminated status;
- (5) Appropriate administrative procedures are established and exercised to maintain control of these areas; and
- (6) Dose rates do not exceed levels which would require posting in accordance with §835.603.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 1, Part 2, Article 125.10

Conditions that could cause or promote the spread of contamination, such as a leaking roof or piping, should be identified and corrected on a priority basis.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 2, Article 222.3

In addition to the posting criteria in Article 235, the conditions for establishing and maintaining Fixed Contamination Areas include all of the following:

- a. Radiological surveys shall be performed to detect contamination that may become removable over time.
- b. A formal inventory shall be maintained of Fixed Contamination Areas.
- c. Markings shall be kept legible.
- d. Removable contamination should not exceed Table 2-2 values and should be reduced as far below Table 2-2 as is reasonably achievable before fixative coating is applied.
- e. Fixed contamination should be covered with two layers of fixative coatings having different colors.
- f. Markings should include the standard radiation symbol, be clearly visible from all directions and contrast with the colors of the surface coatings.

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g. Additional coating should be applied when the bottom color appears.

h. A plan for identifying and adding to the inventory of existing areas of fixed contamination not included in the initial inventory should be developed.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 2, Article 222.6

For contaminated soil that is not releasable in accordance with DOE 5400.5, a Soil Contamination Area shall be established that:

a. Is posted as specified in Article 235. Posting should include instructions or special warnings to workers such as "Consult With Radiological Control Organization Before Digging" or "Subsurface Contamination Exists."

b. Meets the requirements of Article 231.1 through 231.8.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 2, Article 222.7

Soil Contamination Areas may be located outside a Radiological Buffer Area.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 337.1

Use solid barriers to enclose areas wherever practicable

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 337.2

Mark and secure items such as hoses and cords that cross the boundary

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 337.3

Control and direct airflow from areas of lesser to greater removable contamination;

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 3, Article 337.4

Use engineering controls and containment devices such as glovebags, gloveboxes and tents.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 342. 2

Tools and equipment should be inspected to verify operability before being brought into Contamination, High Contamination or Airborne Radioactivity Areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 342. 4

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Engineering controls, such as containment devices, portable or auxiliary ventilation and temporary shielding, should be installed in accordance with the technical work documents and inspected prior to use.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 342. 5

Hoses and cables entering the work area should be secured to prevent the spread of contamination or safety hazards.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 7, Article 372.1

The use of covers, wind screens and runoff collection basins to preclude the inadvertent spread of radioactive material

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 7, Article 372.2

Provisions for worksite personnel to assemble and be monitored prior to release or reestablishment of work.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 7, Article 372.3

Evaluation of work area to determine if a need exists for modified work controls or decontamination.

11.6.2 Personnel, Equipment and Area Decontamination

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 2, Part 2, Article 222.2

Surfaces exceeding the values of Table 2-2 for total contamination may be covered with a fixative coating to prevent the spread of contamination. However, reasonable efforts should be made to decontaminate an area before a coating is applied. A fixative coating shall not be applied without the approval of the Radiological Control Manager.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 342. 1

Work Conduct and Practices

Contamination levels caused by ongoing work shall be monitored and maintained ALARA. Work should be curtailed and decontamination performed at preestablished levels, taking into account worker exposure.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 4, Article 342.10

Requirements for area cleanup should be included in the technical work documents. Work

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activities should not be considered complete until support material and equipment have been removed and the area has been returned to at least prework status.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 6, Article 463.7

Facility line management should be responsible for directing decontamination efforts.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 4, Article 541.3

The extent of skin contamination should be determined prior to initiating decontamination procedures.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 4, Article 541.4

Skin decontamination methods should be established for site-specific radionuclides. Skin abrasion should be avoided during the decontamination process. Intrusive decontamination methods, such as tissue removal, require medical assistance.

11.6.3 Respiratory Protection Program

Issues related to respiratory equipment and supplies are addressed in Section 11.8.2 "Respiration Equipment and Supplies" (this section includes equipment issuance).

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 316.3

When engineering and administrative controls have been applied and the potential for airborne radioactivity still exists, respiratory protection should be used to limit internal exposures. Use of respiratory protection should be considered under the following conditions:

- a. Entry into posted Airborne Radioactivity Areas;
- b. During breach of contaminated systems or components;
- c. Work in areas or on equipment with removable contamination levels greater than 100 times the values in Table 2-2;
- d. During work on contaminated or activated surfaces with the potential to generate airborne radioactivity.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 1, Article 316.5

In specific situations the use of respiratory protection may be contraindicated due to physical limitations or the potential for significantly increased external exposure. In such situations,

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written authorization should be obtained from the line organization manager and the Radiological Control Manager prior to incurring internal exposure. Specific justification of the need to accept the exposure, including a description of measures taken to mitigate the airborne radioactivity, should be documented as part of the authorization process.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 3, Article 531.2

DOE 5480.4 mandates the requirements contained in ANSI Z88.2 and 29 CFR 1910.134 for implementation of the Respiratory Protection Program and associated training of personnel.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 3, Article 533

Use of Respiratory Protection

Personnel using respiratory protection shall:

1. Be issued respirators only upon verification of medical approval, training and fit testing.
2. Perform fit checks of their respirators to ensure a proper seal before entering areas requiring respirator use.
3. Be clean shaven in the area of fit.
4. Use corrective lenses, if needed, that are approved for respirators.
5. Be trained to leave the work area when experiencing respirator failure.
6. Be trained to remove their respirators to avoid life-threatening situations when exiting an area after respirator failure.

11.6.4 Source Containment, Confinement, and Ventilation Control

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 5, Article 453.2

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. An evaluation should be made of continuing operations with compromised engineering controls. The use of respiratory protection to continue activities under these conditions is discouraged. Implementation of short-term engineering modifications that provide a commensurate level of worker protection is the preferred alternative.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 5, Article 453.3

Preventive maintenance and surveillance procedures shall be established to ensure equipment

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controls are maintained in an operable condition for containment of airborne radioactivity.

11.7 Laboratory Analysis

This element addresses requirements for the appropriate handling and laboratory analysis of samples.

REQUIREMENT SOURCE: DOE/EH-0173T, Section 6.1.1

Each monitoring and surveillance organization should have a sample identification system that provides positive identification of samples and aliquots of samples throughout the analytical process. The system should incorporate a method for tracking all pertinent information obtained in the sampling process.

REQUIREMENT SOURCE: DOE/EH-0173T, Section 6.1.2

To Prevent incorrect analysis results caused by the spread of contamination among samples, each laboratory should establish and adhere to written procedures to minimize the possibility of cross-contamination between samples. High-activity samples should be kept separate from low-activity samples. In addition, the integrity of samples should be maintained; that is, the degradation of samples should be minimized by using proper preservation and handling practices that are compatible with the analytical methods used.

REQUIREMENT SOURCE: DOE/EH-0173T, Section 6.2

To comply with the sample identification system requirement, all pertinent information on the samples and their analysis should be recorded in a permanent laboratory record book and/or computer system with hardcopy backup. The sample identification number should enable tracking of the exact location of the record entry or computer file and indicate the chain of custody for the samples.

REQUIREMENT SOURCE: DOE/EH-0173T, Section 6.2.3

High- and low-activity samples should be treated in different laboratories, or at least in separate, distinct locations of the laboratory. The measurements made during sample screening with survey instruments should be among the criteria used to determine which laboratory (location) will receive the sample. Laboratory glassware that has been used in processing highly radioactive samples should be appropriately discarded and not reused. A clean material, such as bench paper, should be used to cover laboratory benches before processing a set of samples. Periodic surveys of gross activity levels in the laboratory should be conducted to detect any contamination that might occur. Detected contamination should be removed by proper decontamination practices. Following physical and chemical treatment of the original samples, the resulting samples should again be sealed in plastic bags before being transported to the counting room for counting.

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11.8 Radiation Protection Equipment and Supplies

11.8.1 Respiratory Equipment and Supplies

This subelement addresses those requirements related to respiratory equipment and supplies (including issuance). The selection and proper use of respiratory equipment is addressed in Section 11.6.3, Respiratory Protection Program.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 5, Part 3, Article 531.4

Positive controls shall be maintained for the issue, use and return of respirators to ensure that only qualified personnel wear respirators.

11.8.2 Protective Clothing

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 325.1

Personal Protective Equipment and Clothing
Personnel shall wear protective clothing during the following activities:

- a. Handling of contaminated materials with removable contamination in excess of Table 2-2 levels;
- b. Work in Contamination, High Contamination and Airborne Radioactivity Areas;
- c. As directed by the Radiological Control Organization or as required by the RWP.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 325.2

Protective clothing and shoes designated for radiological control shall be:

- a. Marked in accordance with Article 451;
- b. Used only for radiological control purposes.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 325.3

Protective clothing dress-out areas should be established directly adjacent to the work area. Workers should proceed directly to the radiological work area after donning Personal Protective Equipment and clothing.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 325.4

Personal Protective Equipment and clothing shall be selected as prescribed by the controlling

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RWP. General guidelines for protective clothing selection and use are provided in Appendix 3C and in Table 3-1.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 325.5

The use of lab coats as radiological protective clothing is appropriate for limited applications such as those discussed in Appendix 3C where the potential for personal contamination is limited to the hands, arms, and upper front portion of the body. Lab coats should not be used as protective clothing for performing physical work activities in Contamination, High Contamination or Airborne Radioactivity Areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 325.6

Instructions for donning and removing protective clothing should be posted at the dress-out and step-off pad areas.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 325.7

The use of Personal Protective Equipment or clothing (including respiratory protection) beyond that authorized by the Radiological Control Organization detracts from work performance and is contrary to ALARA principles and waste minimization practices. Such use should not be authorized.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 3, Part 2, Article 325.8

Company-issued clothing, such as work coveralls and shoes, should be considered the same as personal clothing. Company-issued clothing should not be used for radiological control purposes.

REQUIREMENT SOURCE: DOE/EH-0256T, Revision 1, Chapter 4, Part 6, Article 462.6

Cleaned Personal Protective Equipment and laundered protective clothing shall be inspected prior to use. Clothing should be free of tears, separated seams, deterioration and damage, or repaired in a manner that provides the original level of protection.

11.9 Radiation Protection of the Public and Environment

11.9.1 Dose Limits

Dose limits and other requirements related to general public exposures and exposures from discharges/effluents are included in the Environmental Protection Functional Area.

11.9.2 Liquid Waste Discharges

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Requirements which specify control of radioactive liquid discharges to surface waters, aquifers or public sewage systems are included in the Environmental Protection Functional Area.

11.9.3 Solid Waste Disposal

Requirements which regulate the disposal of solid radioactive waste are included in the Waste Management Functional Area.

11.9.4 Demonstration of Compliance

Requirements for the monitoring and surveillance of radioactive effluents are included in the Waste Management Functional Area and the Environmental Protection Functional Area.

11.10 KEY INTERFACES

Radiation Protection is a unique functional area in that all other functional areas at some time are likely to interface with Radiation Protection in the extension of their prescribed responsibilities. The following sections do not address this type of interface as it is understood that any group which has need to access or otherwise impact a radiologically controlled area will have some level of interface with the Radiation Protection functional area.

11.10.1 Management Systems

An interface to Management Systems is needed to ensure that a commitment to radiation protection and ALARA is incorporated into every aspect of operations at the highest management level.

11.10.2 Quality Assurance

An interface to the Quality Assurance Functional Area is needed to ensure that all requirements for the radiation protection of the workers and the general public and all reporting requirements are properly incorporated into operations.

11.10.3 Configuration Management

Activities in the Configuration Management Functional Area must interface to the Radiation Protection (RP) Functional Area to ensure that current radiation protection systems are not compromised by modifications, and that new activities receive the proper

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review in case new systems are needed as part of routine surveillance/maintenance and/or as part of D&D activities.

11.10.4 Training and Qualification

An interface to Training and Qualifications is necessary to ensure that the specific Radiation Protection (RP) training requirements are included in the worker training profiles.

11.10.5 Emergency Planning

Because of the potential for emergency situations involving radioactive material and potential exposure of emergency response personnel, an interface to Emergency Planning is required.

11.10.6 Engineering Program

An Engineering Program and ALARA interface is necessary for the routine review of new construction and modifications required as part of routine surveillance/maintenance and/or as part of D&D activities. This review should include a cost/benefit analysis for radiation exposure reduction features beyond those required by regulatory exposure limits.

11.10.7 Operations

An interface to the Operations Functional Area is needed to ensure that radiation protection and the ALARA principle is incorporated into daily operations.

11.10.8 Maintenance

An interface with the Maintenance Functional Area is needed because the monitoring systems used for radiation protection must have a maintenance plan, and because other areas of maintenance must be aware of potential radiation hazards.

11.10.9 Packaging and Transportation

Physical management of radioactive materials requires an interface to the Packaging and Transportation Functional Area to ensure proper labeling, packaging and transportation of those materials.

11.10.10 Research and Development and Experimental Activities

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Although the 324 Facility has R&D activities, requirements for this functional area are located throughout other functional area sections.

11.10.11 Nuclear Safety

Because the Nuclear Safety Functional Area encompasses the operation of nuclear facilities from design through decommissioning, an interface with the Radiation Protection (RP) Functional Area is necessary to ensure that radiation protection standards are incorporated into the nuclear safety program.

11.10.12 Environmental Protection

Because of the requirements for limiting release of radioactive materials to the environment, an interface with the Environmental Protection Functional Area is necessary to ensure a consistent approach to application of environmental protection requirements.

11.10.13 Waste Management

The Radiation Protection Functional Area interfaces with the Waste Management Functional Area by establishing radiological safety requirements for all radioactive Waste Management activity.

11.10.14 Occupational Safety and Health

The Radiation Protection Functional Area, in conjunction with the Occupational Safety and Health Functional Area, establishes policies and procedures to ensure exposures are kept as low as reasonably achievable (ALARA). The Radiation Protection Functional Area and the Occupational Safety and Health Functional Area Coordinate all routine and non-routine activities to ensure employee health and safety.

11.11 References

11.11.1 Requirement Source Documents

The following documents were used as requirement sources in the development of this S/RID:

10 CFR 835, Occupational Radiation Protection, 12/13/93.

DOE 5400.5, Radiation Protection of the Public and the Environment, 2/8/90.

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DOE/EH0173T, Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance, 1/91.

DOE/EH0256T, DOE Radiological Control Manual, 4/30/94.

11.11.2 Reviewed Documents Not Used as Requirement Sources

The following Documents were reviewed as requirement sources but were not used in the development of this S/RID:

10 CFR 20, Standards for Protection Against Radiation, 12/31/93.

WAC 246-243, Department of Health, 1/1/90.

WAC 402-24, Washington Administrative Code-Standards for Protection against Radiation, 12/31/89.

DOE 5000.3A, Occurrence Reporting and Processing of Operations Information, 5/30/90.

DOE 5400.1, General Environmental Protection Program, 6/29/90.

DOE 5400.9, Sealed Radioactive Source Accountability, 2/8/90.

DOE 5480.1B, Environmental, Safety, and Health Protection Program for DOE Operations, 9/23/86.

DOE 5480.5A, Safety of Nuclear Facilities, 8/2/90.

DOE 5480.15, Department of Energy Laboratory Accreditation Program for Personnel Dosimetry, 12/14/87.

DOE 5480.20A, Personnel Selection, Qualification, Training and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities, 11/15/94.

DOE 5480.24, Nuclear Criticality Safety Program, 8/12/92.

DOE 5483.1B, Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor-Operated (GOCO) Facilities, 5/31/89.

DOE 6430.1A, General Design Criteria, 4/6/89.

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DOE-EH0256T, U.S. Department of Energy Radiological Control Manual, 6/1/92.

DOE-PNL-6534, Health Physics Manual for Good Practices for Plutonium Facilities, 1988.

ANSI/ASME N510, Testing of Nuclear Air Cleaning Systems, 1980.

ANSI-N13.14-1983, Internal Dosimetry Standard for Tritium, 1983.

ANSI N13.15-1985, Performance of Personnel Thermoluminescence Dosimetry, 1985.

ANSI-N13.27-1981, Performance Requirements for Pocket-Sized Alarm Dosimeters and Alarm Ratemeters, 1981.

ANSI-N42.6-1980, Bases for GM counter tubes interrelationship of Quartz- Fiber Electrometer Type Exposure Meters and Companion Exposure Meter Charges, 1980.

ANSI-N42.9-1972, IEEE Standard Test Procedures for Photomultipliers for Scintillation Counting and Glossary for Scintillation Counting Field, 1972.

ANSI-N42.12-1980, Sodium Iodide Detector Systems, Calibration and Usage, 1980.

ANSI-N42.15-1980, Performance verification of Liquid-Scintillation Counting Systems, 1980.

ANSI-N43.3-1993, Installations using Non-Medical X-Ray and Sealed Gamma Ray Sources - Energies up to 10 MeV, 1/28/93.

ANSI-N322-1977, Inspection and Test Specification for Direct and Indirect Quartz Fiber Pocket Dosimeters 1983.

ICRP 54, Individual Monitoring For Intakes of Radionuclides by workers: Design and Interpretation, 1988.

ICRU 14, Radiation Dosimetry: X-rays and Gamma Rays with Maximum Photon Energies between 0.6 and 50 MeV, 9-15-69.

NCRP 65, Management of Persons Accidentally Contaminated with Radionuclides, 4-15-80.

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NCRP 84, General Concepts for the Dosimetry of Internally Deposited Radionuclides, 9-30-85.

NCRP 87, Use of Bioassay Procedures for Assessment of Internal Radionuclide Deposition, 2-28-87.

NUREG-0041, Manual of Respiratory Protection Against Radioactive Materials, 10/76.

NUREG-0761, Radiation Protection for Nuclear Power Plant Licensees, 3/1/81.

RIDs by Document X-Reference Listing
Based on 324-RP-SD RID and including all documents.

10 CFR 835, Occupational Radiation Protection, Dated 12-14-93

DOE ORDER 5400.5, Radiation Protection of the Public and the Environment, Revision C02

DOE/EH-0173T, Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance

DOE/EH-0256T, U.S. Department of Energy Radiological Control Manual, Revision 1

***** End of RIDs by Document X-Reference Listing *****

This document was too large to scan as a whole document,
therefore it required breaking into smaller sections.

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Section 2 of 2

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(324 Bldg.)

Date: 5/27/97 Revision: A000

Originator: Kammenzind, D.E.
Co: BWNC

Recipient: _____
Co: _____

References: EDT-618724

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12.0 Fire Protection

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract level S/RID.

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For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

This functional area comprehensively excerpts applicable verbatim requirements from DOE Order 5480.7A and RLID 5480.7. There are other extensive and numerous applicable requirements in other sources, primarily DOE Order 6430.1A, GENERAL DESIGN CRITERIA, and NFPA Codes and Standards. Applicable specific requirements from these standards are too extensive to comprehensively enumerate here. DOE Order 6430.1A only applies to new facility acquisition and modifications to existing facilities. The transition to an industrially safe plant condition is not expected to include design of new fire systems or significant modifications to operable systems. Since this S/RID only applies to the existing 324 Facility, extensive verbatim requirements from DOE Order 6430.1A are not included. The existing 324 modifications and work control processes for physical facility changes that impact fire safety require the review and concurrence of a qualified fire protection engineer. The applicable requirements of DOE Order 6430.1A to facility modifications are implemented during the modification and work control processes. In accordance with DOE Order 5480.7A, fire protection requirements of the applicable NFPA Codes and Standards must be applied with the assistance of a qualified fire protection engineer.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the

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Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

12.1 Management and Administration

NOTE: Application of Codes and Standards

The Fire Protection related codes and standards in effect when facility design commences (code of record) remain in effect for the life of the facility. When modifications of a substantial nature occur, as determined by the authority having jurisdiction (AHJ), the current edition of the code shall apply to the modification.

EXCEPTION: If there is significant hazard that endangers building occupants or the public, as determined by the AHJ, the facility shall be upgraded to the requirements of the current edition of the codes and standards.

12.1.1 Management

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 8.i

Contractor Organizations.

As required by the PSO or the Heads of Field Organizations and directed by the Contracting Officer, contractors shall be required to:

- (1) Provide and maintain a level of fire protection to meet the objectives of paragraph 4, and the criteria of paragraph 9.
- (2) 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.
- (3) Assists 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.
- (4) Establish and maintain a list of facilities for which the contractor has fire protection

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assessment responsibility.

- (5) Conduct fire protection assessments of facilities according to the scope and frequency established by this Order.
- (6) Provide fire protection technical assistance to DOE.
- (7) Submit request 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.
- (8) Maintain or have access to an adequate fire protection staff, including a qualified fire protection engineer(s). Continuing education and training should be provided to maintain and enhance the level of competency of the fire protection staff.

12.1.2 Administrative

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9 Paragraph 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 Risks/Improved Risks). This program is characterized by the inclusion of a continuing, sincere interest on the part of management and employees in minimizing losses from fire and related perils and the inclusion of preventive features necessary to ensure the satisfaction of objectives related to safety.

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9 Paragraph 2

Based on the above paragraph the DOE Fire Protection Program shall meet or exceed the minimum requirements established by the National Fire Protection Association as directed by the PSO. 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. 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 necessary as determined by the AHJ.

12.1.2.1 Fire Prevention Procedures

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.c.(1)

Fire Prevention Procedures. Facilities shall have procedures governing the use and storage of

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combustible, flammable, radioactive and hazardous materials as to minimize the risk from fire. 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.

12.1.2.2 Assessment Results Tracking Program

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.c.(2)

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. Resolution could be achieved by either: plant modification, procedure change, fire safety equivalency, or exemption.

12.1.2.3 Interim Compensatory Measures

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 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.

12.1.2.4 Operability Specifications

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.c.(4)

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. Periodic tests, conducted to satisfy the applicable NFPA codes and standards or other DOE criteria shall confirm that these features are operable. If fire protection will be inoperable for a significant period of time, interim compensatory measures shall be implemented until operability is restored.

12.1.2.5 Emergency Planning

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.c.(5)

Emergency Planning. Information from the fire protection program shall be incorporated in the Emergency Plan. The facility fire protection organization shall be involved in the development of the Emergency Plan and in all related training and drills.

12.1.2.6 Training

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Refer to the FDH Contract level Fire Protection and Training and Qualification Functional Areas for additional requirements pertaining to Fire Protection.

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 7

Employees must be provided annual fire prevention training. The training must be documented and include:

- a. Good housekeeping practices.
- b. Proper response and notification in the event of fire.
- c. Instructions on the use of portable fire extinguishers. Employees, who perform fire watches, must receive hands-on portable fire extinguisher training, as required by 29 CFR 1910.
- d. Recognition of potential fire hazards.

12.1.2.7 Communications

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.c.(7)

Communications. Emergency communications shall be outlined in the emergency plan. The communications capability among potential responders to an emergency shall be coordinated to avoid confusion and interference. This capability shall be tested on a frequency established by the authority having jurisdiction in accordance with DOE criteria.

12.2 Fire Protection Program

Author's Note: Per DOE 5480.7A, this order has primacy over all other DOE Orders with respect to matters concerning Fire Protection.

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 5 Introduction, and 5.a thru 5.h

Author's Note: DOE/EV-0043, 8-79, "Standard on Fire Protection for Portable Structures" has been replaced by DOE-STD-1088-95, "Fire Protection For Relocatable Structures".

5. MANDATORY FIRE PROTECTION CRITERIA. Fire protection criteria, delineated in the following codes, standards and other documents are the minimum requirements for the implementation of the DOE Fire Protection Program. These criteria are mandatory as a result of statutory requirements or DOE policy requirements. Where conflicts in the application of these codes and standards arise, the more restrictive requirements apply.

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- a. Code of Federal Regulations (CFR) 29, Part 1910.
- b. CFR 29, Part 1926.
- c. National Fire Protection Association (NFPA) Codes and Standards.
- d. DOE 5480.4, ENVIRONMENTAL PROTECTION, SAFETY, AND HEALTH PROTECTION STANDARDS, of 5-15-84, which specifies requirements for the application of environmental protection, safety, and health standards.
- e. DOE 6430.1A, GENERAL DESIGN CRITERIA, of 4-6-89, which provides general design criteria for use in the acquisition of the Department's facilities.
- f. DOE/EP-0108, "Standard for Fire Protection of AEC Electronic Computer Data Processing Systems".
- g. DOE/EV-0043, 8-79, "Standard on Fire Protection for Portable Structures".
- h. Other DOE Orders and statutory requirements, not listed above, that contain requirements of a more limited extent relating to the DOE Fire Protection Program.

12.2.1 Fire Protection

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.b.(5)

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.

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 2.d

Gloveboxes handling hazardous or radioactive materials shall be protected from the effects of fire. The level of protection required shall be determined using the Glovebox Fire Protection Criteria contained in the DOE Fire Protection Resource Manual.

12.2.2 Fire Protection Suppression Systems

12.2.2.1 Automatic Fire Suppression Provisions

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.b.(3)

Automatic Fire Protection - Complete automatic fire suppression systems designed in accordance with applicable NFPA standards shall be provided as follows:

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(a) In all new structures over 5000 square feet

(b) 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.

12.2.2.2 Special Fire Suppression Systems

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.b.(13)

Special Hazard Protection - Hazards unique to DOE and not addressed by 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. In addition devices for limiting or controlling the effects of a fire (relief valves, filters, blast walls, emergency shutdown systems, scuppers, etc.) shall be provided.

12.2.2.3 Control of Liquid Runoff

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.b.(10)

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. 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.

12.2.3 Water Supply and Distribution Systems

12.2.3.1 Water Supply Systems

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 9

The Fire Protection Program must include a fire protection system winterization program to ensure that fire protection systems are protected against cold weather effects. The winterization program shall require that:

a. Each operation or facility with fire protection systems is inspected annually, prior to the month of November, to ensure that freeze protection systems are provided where fire suppression systems, subject to damage by freezing, are located.

b. As a minimum, fire protection system auxiliary drains, drip lines, fire pump test headers, and fire department connections are adequately drained to prevent fire system freeze up. The program

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shall also ensure that dry pipe system air pressures are normal, and air compressors and air maintenance devices for dry systems are operational.

c. Heating systems utilizing fuel systems have an adequate supply of fuel and a strategy to replenish fuel supply during cold weather periods.

d. Freeze protection systems are properly functioning throughout the freezing weather period.

12.2.3.1.1 Fire Hydrant Capacity

While the applicable DOE Order 6430.1A requirements are contained in the FDH Contract level Fire Protection Functional Area, the responsibility to ensure compliance with those requirements resides at both the FDH Contract and facility level.

12.2.3.1.2 Water Distribution Loop Systems

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 1.b

Sectional valves shall be installed in the following manner for new installations and water distribution main upgrades:

(1) Multiple sectional isolation valves shall be provided at each intersection between a supply source and a main loop (one valve for each leg).

(2) Sectional valves shall be installed in accordance with a point system, such that no more than six points accumulate between sectional valves. The points for this arrangement are: one point for a fire hydrant, and two points for an automatic sprinkler system.

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 1.c

Author's Note: This requirement will apply on a case by case basis, for both new and existing facilities, recognizing a facility's location must be considered to determine the benefit of this criteria. Ref: Letter dated July 28, 1994, GM Wise (WHC) to PE Rasmussen (DOE-RL), "RLID 5480.7 Implementation Plan."

Water supplies for fire protection shall be of the looped grid type, providing two points of supply and two-way flow with sectional valving arranged to provide alternate water flow paths from the source to any point in the distribution system, where MPFL exceeds \$1 million.

12.2.4 Passive Fire Protection

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 2.b

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A program for the inspection and/or testing and maintenance of fire doors, fire dampers, and fire walls or separations shall be developed and implemented for each contractor.

12.2.4.1 Fire Barrier Design Requirements

Author's Note: Additional Fire Barrier Design requirements can be located in Section 12.2.2.1 Automatic Fire Suppression Provisions.

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.b.(4)

Redundant Fire Protection -

(a) When the MPFL exceeds \$50 million, a redundant fire protection system is provided that, despite the failure of the primary fire protection system, will limit the loss to \$50 million.

(b) When the MPFL exceeds \$150 million, a redundant fire protection system and a 3-hour fire barrier are required to limit the maximum possible fire loss to \$150 million.

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 2.a

Fire rated assemblies shall be installed, as required in DOE 6430.1 version in effect and other applicable standards, to reduce loss potentials.

12.2.5 Life Safety

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.b.(2)

Life Safety - Life safety provisions shall be provided for all facilities in accordance with the Life Safety Code (LSC), NFPA Standard 101. The methods outlined in NFPA 101M may be used to obtain an equivalent level of life safety where strict compliance is not possible. Exit requirements for toxic and explosive environments shall be as determined by the AHJ. In addition, for explosive environments, exits shall reflect the criteria contained in the DOE Explosives Safety Manual, (DOE/EV 06194). 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. Compliance with the Life Safety Code shall be considered to satisfy the exit requirements of the applicable building code and OSHA 29 CFR 1910.

12.2.6 Improved Risk Facilities

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.b.(17)

Higher Standard of Protection - A higher standard of protection, which includes fire protection features beyond those stipulated above, may be warranted under certain circumstances. These

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features shall be determined by the PSO . The following factors shall be considered:

- (a) importance
- (b) effect on production
- (c) costs versus benefits
- (d) future conditions

12.2.7 Decommissioning Planning

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 3

Required fire protection features (includes fire department emergency response capabilities) shall be maintained throughout the life of a facility or operation. When a facility is no longer required for a DOE mission and is scheduled for shutdown, decommissioning, and demolition, all of the following must be completed before any fire protection feature is deactivated, no longer maintained, and/or removed from service:

- a. Property book value of the facility or operations (includes building and building contents) must be devaluated below levels, which would require certain fire protection features. Even if property has no inherent value but property is shown to have record value, fire protection must be maintained until recorded value is lowered below protection requirements.
- b. An analysis must be performed to demonstrate that a radiological or hazardous material release, beyond DOE guidelines, is not possible. The analysis must be performed or reviewed by a qualified Fire Protection Engineer. If fire protection feature(s) are determined necessary to prevent a radiological or hazardous release, then fire protection feature(s) must remain in place until radiological or hazardous materials are removed.
- c. For life safety purposes, fire protection features may only be deactivated after personnel are no longer occupying the facility. For purpose of this section, a facility is considered to be occupied, as defined by NFPA 101, Life Safety Code.
- d. Decommission and demolition activities must be coordinated with the Hanford Fire Department for fire and emergency medical response services.

12.2.8 Construction

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.b.(6)

Quality Construction - New Permanent structures in excess of 5000 square feet of area shall be of noncombustible or fire resistive construction.

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 4.a

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Fire protection must be provided on all construction sites, as required by applicable sections of NFPA 241, Safeguarding Construction, Alteration, And Demolition Operations, and NFPA 1141, Fire Protection In Planned Building Groups.

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 4.b

Where underground water mains and hydrants are to be provided, they shall be installed, completed, and in service, prior to accumulation of combustible materials on the project site, and prior to the completion of any project structure.

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 4.c

Construction sites shall provide and maintain fire department vehicle access. The access roads shall have an unobstructed driving surface width of at least 20 feet during all weather conditions, and be able to withstand the live loads of fire department apparatus.

12.2.9 Fire Alarm Systems

Author's Note: NFPA 71, 72A, B, C, D, E, F, G, H, and 74 have been consolidated into NFPA 72.

Signals from detection systems are fed to fire alarms panels which in turn are transmitted to local fire alarms and the Central Alarms Stations.

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.b.(11)

Fire Alarm Systems - Where fire suppression or fire alarm systems are provided local alarms in the protected area and alarm transmission to an acceptable re-mote attended location shall be provided.

12.3 Fire Hazard Analysis

Author's Note: DOE Order 5480.7A Section 9.a(3) has omitted the letter (k) when identifying the 15 elements of a fire hazards analysis. The text provided below identifies the same 15 elements in the same order as the source document.

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.a.(3)

Fire Hazards Analyses. The purpose of a fire hazards analysis (FHA) is to comprehensively assess the risk from fire within individual fire areas in a DOE facility in relation to existing or proposed fire protection so as to ascertain whether the objectives of paragraph 4, are met. A

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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. A Safety Analysis Report (SAR) that addresses the following elements will satisfy the requirements for an FHA. A graded FHA shall contain, but not be limited to, the following elements:

- (a) Description of construction
- (b) Protection of essential safety class equipment
- (c) Fire protection features
- (d) Description of fire hazards
- (e) Life safety considerations
- (f) Critical process equipment
- (g) High value property
- (h) Damage potential: Maximum Credible Fire Loss (MCFL) and Maximum Possible Fire Loss (MPFL)
- (i) Fire Department/Brigade response
- (j) Recovery potential
- (l) Potential for a toxic, biological and/or radiation incident due to a fire
- (m) Emergency planning
- (n) Security considerations related to fire protection
- (o) Natural hazards (earthquake, flood, wind) impact on fire safety
- (p) Exposure fire potential, including the potential for fire spread between fire areas.

An FHA shall be performed under the direction of a qualified fire protection engineer.

REQUIREMENT SOURCE: RLID 5480. 7, Section 6.2.e

Perform FHA of facilities in accordance with DOE 5480.7A and EH-31.3, Guidance on Performance of Fire Hazard Analyses, memorandum dated 11-07-91. FHA shall be completed for all new facilities, as required by DOE 6430.1 version in effect, and all existing nuclear facilities, where safety analyses are required by DOE 5480.23. The development of a facility design basis fire in accordance with DOE 6430.1 version in effect, as required in safety analysis documentation, must be consistent with the MPFL event and documented in the facility FHA.

The FHA shall be referenced by the safety analysis documentation. MCFL and MPFL values described in the FHA shall be as required by DOE 5480.7A, utilizing the property valuation and loss estimation guidelines found in DOE 5484.1. New facility and nuclear facility FHA shall be reviewed and approved by QSH. When directed by the PSO, the FHA shall also follow the same review and approval process as safety analysis documentation for DOE 5480.23. A copy of the current FHA shall be retained by the contractor and be kept readily accessible on file.

12.4 Fire Prevention (Building Design)

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Fire Prevention requirements shall comply with 29 CFR 1910, 1 NFPA, Fire Prevention Code and Authority, Responsibilities, and Duties of the Hanford Fire Marshall Attachment of the Fire Prevention Program Description contained in the HANFORD CHAPTER of the DOE FIRE PROTECTION RESOURCE MANUAL.

12.4.1 Performance Objectives in the Design of DOE Facilities

Author's Note: Requirements for Performance Objectives in the design of DOE Facilities can be found in Section 12.2.8 Construction.

12.4.2 Fire Resistance for Materials and Construction

Author's Note: Requirements for Fire Resistance for Materials and Construction can be found in Section 12.2.8 Construction.

12.4.2.1 Interior Finish Materials

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 2.e

Nuclear facilities and laboratories shall have interior finish materials (decorations, furnishings, and exposed wall or insulating materials) that have an Underwriters Laboratories (ASTM E-84/NFPA 255) flame spread rating of 25 or less, and smoke developed rating of 50 or less, except for acoustical materials, which shall have a smoke developed rating of 100 or less. The minimum average critical radiant flux for floor covering material shall be 0.45 watts per square centimeter, when tested in accordance with ASTM E-648 (NFPA 253).

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 5

The generation, treatment, storage, and disposal of ignitable and reactive wastes, defined in Dangerous Waste Regulations, WAC 173-303, that are utilized in the facilities and operations covered under the Tri-Party Agreement shall comply with this directive and shall:

- a. Comply with the fire protection provisions of WAC 173-303.
- b. Be located in areas that are designed, operated, and maintained in a manner equivalent to the Uniform Code (UFC), when ignitable and reactive wastes are stored in containers.
- c. Be inspected on an annual basis by a person familiar with the UFC, where wastes are stored.

12.4.3 Exhaust and Ventilation Systems

12.4.3.1 Ductwork and Air Ventilation Systems

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REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.b.(12)

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.

12.4.3.2 HEPA Filters

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 2.c

Nuclear facility final exhaust/confinement high efficiency particulate air filters shall be protected for failure due to a fire. The level of protection required shall be determined using the Filter Plenum Fire Protection Criteria contained in the DOE Fire Protection Resource Manual.

12.4.4 Seismic Requirements

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.b.(15)

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.

12.4.5 Safety Class Equipment

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.b.(1)

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. For new facilities, redundant Safety Class equipment shall be located in separate fire areas. Fire suppression systems shall be designed such that their actuation will not damage safety class equipment or cause a criticality incident.

12.5 Fire, HAZMAT and Medical Support

Fire and related emergency response is provided by the Hanford Fire Department. Requirements related to the Fire Department are covered under the FDH Contract level Fire Protection Functional Area.

12.6 Facility/Program Assessments

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.a.(2)

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Author's Note: Frequencies determined by the AHJ are found in requirement source: RLID 5480.7, Section 6.2 of this subelement.

Assessments. Documented evaluations of the fire protection program, including field walkdowns of facilities, shall be performed as follows:

(a) Facilities/contractors shall be assessed to establish that they conform with DOE fire protection criteria.

(b) Minimum Frequency

Headquarters:

PSO assessment of field offices 3 years

EH assessment of program offices 3 years

Field Office:

Field office assessment of the fire protection program of each contractor 2 years

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.

Fire protection assessments shall be made at least every two years of facilities plus equipment valued at \$10 million to \$50 million.

Remaining facilities shall be assessed at least every three years or at frequencies determined by the AHJ.

Comprehensive assessments of fire protection program elements shall be made every two years.

Copies of the two most recent assessment reports shall be kept on file.

(c) Nature and Scope - Assessments shall include an evaluation of the following elements of the fire protection program:

Program-Related:

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- 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.

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.

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.

REQUIREMENT SOURCE: RLID 5480. 7, Section 6.2

RL Contractors shall assure that facilities and programs under their jurisdiction provide a level of fire protection adequate to meet the objectives of DOE 5480.7A for protection of the public, personnel, environment, and property. RL Contractors shall also:

- a. Submit the "Annual Industrial Summary of Fire and Other Property Damage Experience" report

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(three copies) for the previous calendar year to the RL Director of QSH by February 1st of each year, as required by DOE 5484.1 and as supplemented by RL direction.

b. Report fires to QSH and losses, in accordance with paragraph 8.8 of this directive.

c. Property loss valuation shall be determined by utilizing the property valuation and loss estimation guidelines found in DOE 5484.1.

d. Schedule and perform fire protection assessments for all facilities, including those for which the contractor has only landlord or lessee responsibility. Assure that the fire protection program elements, described in DOE 5480.7A and this directive, are being implemented.

(1) Annual fire protection assessments shall be made of facilities valued in excess of \$50 million; where considered to be moderate (Category 2 Hazard) or high hazard (Category 1 Hazard), as defined in DOE 5481.1B, for non-nuclear facilities and in DOE 5480.23, for nuclear facilities; or in which vital programs are involved.

(2) Fire protection assessments shall be made at least every two years of facilities valued at \$10 million to \$50 million.

(3) Fire protection assessments shall be made at least every three years of facilities valued and \$1 million to \$10 million.

(4) Except for paragraph 6.2d.(5) of this directive, fire protection facility assessments shall contain the required nature and scope elements contained in DOE 5480.7A. Facility assessments shall also contain findings and observations of fire protection deficiencies identified.

(5) Facilities, where property is less than \$1 million, shall not require a fire protection facility assessment that contains the required nature and scope elements contained in DOE 5480.7A, unless significant programmatic impacts, hazardous materials, or radioactive materials are involved. Such facility assessments shall be made at least every three years.

Exception: A fire protection assessment shall be made at least every three years of facilities valued at \$250,000 to \$ 1 million. The documented assessment for these facilities only needs to include findings, observations, and recommendations. Where applicable, these assessments should include, as a minimum, findings and observations and supporting documentation that identify fire hazards that could cause facility loss or life safety concerns.

(6) Fire protection facility assessments shall be retained by the contractor, and made available to RL representatives upon request. Copies of the two most recent assessment reports shall be kept readily accessible on file.

(7) Facility assessments findings, observations, and/or recommendations shall be entered into data

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base tracking system and assigned and appropriate prioritization, to ensure that effective actions are being taken to correct deficiencies identified in accordance with RLID 1000.1.

(8) MCFL and MPFL values described in the assessments shall be as required by DOE 5480.7A utilizing the property valuation and loss estimation guidelines found in DOE 5484.1.

(9) Maintain a list of facilities which require assessment, indicating the assessment frequency.

e. Perform FHA of facilities in accordance with DOE 5480.7A and EH-31.3, Guidance on Performance of Fire Hazard Analyses, memorandum dated 11-07-91. FHA shall be completed for all new facilities, as required by DOE 6430.1 version in effect, and all existing nuclear facilities, where safety analyses are required by DOE 5480.23. The development of a facility design basis fire in accordance with DOE 6430.1 version in effect, as required in safety analysis documentation, must be consistent with the MPFL event and documented in the facility FHA.

The FHA shall be referenced by the safety analysis documentation. MCFL and MPFL values described in the FHA shall be as required by DOE 5480.7A, utilizing the property valuation and loss estimation guidelines found in DOE 5484.1. New facility and nuclear facility FHA shall be reviewed and approved by QSH. When directed by the PSO, the FHA shall also follow the same review and approval process as safety analysis documentation for DOE 5480.23. A copy of the current FHA shall be retained by the contractor and be kept readily accessible on file.

f. Provide fire protection overview and assistance for subcontractor activities and facilities.

g. Carry out those responsibilities assigned by DOE 5480.7A, paragraphs 8i(1) through 8i(8), and comply with the applicable provisions of DOE 6430.1 versions in effect.

h. Establish a written and documented fire protection program for facilities and operations managed, including:

(1) A statement of management commitment to achieve the above stated objectives.

(2) A policy statement that implements DOE 5480.7A, other DOE fire protection related mandatory codes and standards, and requirements contained in this directive.

(3) 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.

(4) See paragraph 8.12 of this directive for guidance on developing the documented fire protection program.

i. Maintain a current statement of programmatic impact on every vital program, as determined by

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RL or the PSO. The statement of programmatic impact will be updated every three years. The statement will include facilities, material, and equipment that are vital to the operation of that program.

j. Each prime contractor shall have on staff at least one qualified Fire Protection Engineer (see paragraph 5.2).

k. 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 the fire protection engineering group of design documentation and testing of fire protection features.

l. Provide fire protection representation at the Hanford Fire Protection Forum meeting, as described in the Hanford Fire Protection Forum Charter.

m. Attend and provide representation at the monthly program interface meetings with the RL fire protection representative.

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 8

Fire investigations and reports shall be performed and prepared, in accordance with DOE 5000.3B and DOE 5485.1.

12.6.1 Control of Fire Protection Impairments

REQUIREMENT SOURCE: DOE ORDER 5480. 7A, Section 9.b.(16)

Impairment Control - A fire protection system impairment program shall be provided for control of operation and tracking of impairments during periods when fire protection systems are out of service.

REQUIREMENT SOURCE: RLID 5480. 7, Section 8. 6

The Fire Protection Program must include a fire protection system impairment strategy to minimize the duration and impact of fire protection system impairments. Elements of the fire protection impairment strategy must provide that:

a. Fire protection system impairments are identified, assigned priority, and promptly corrected in a reasonable amount of time.

b. A documented impairment program is administrated by trained personnel.

c. Fire protection staff and fire department personnel are advised and updated on impairments.

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- d. A policy is established for immediate and expedient repair of impairments.
- e. Compensatory measures are implemented until the impaired system is restored.

12.7 KEY INTERFACES

12.7.1 Configuration Management

The Configuration Management Functional Area maintains the technical baseline of the installed fire protections systems and related equipment, construction services, and temporary modifications to existing and new facilities.

12.7.2 Engineering Program

The Engineering Program ensures that design features needed to mitigate fire hazards identified by the Fire Protection Functional Area are incorporated into the design. The Engineering Program provides the necessary facility support services required by fire protection systems. Specific requirements for the Fire Protection Functional Area should include the following subelements:

- a. Design and operability for fire protection features;
- b. Test of fire protection features to ensure operability and compliance with applicable codes and standards;
- c. Interim compensatory measures; and
- d. Design control of procurement and construction.

12.7.3 Emergency Management

The Emergency Management Functional Area addresses the general requirements applicable to the Fire Protection Functional Area for fire-related HAZMAT, medical or other emergency responses. Development of specific Fire Protection requirements should be coordinated with, and supported by, the Emergency Management Functional Area which includes the following subelements:

- a. Coordination of off-site fire department emergency responses and training;
- b. Fire drill criteria development;

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- c. Emergency medical, search, and rescue operations;
- d. Emergency Plan Development; and
- e. Emergency communications.

12.7.4 Training and Qualification

Additional Fire Protection Training and Qualification requirements are addressed in the 324 Training and Qualification Functional Area document, as well as the site Fire Protection and Training and Qualification Functional Area documents.

12.7.5 Nuclear Safety

The Nuclear Safety Functional Area details the provisions for the preparation of Safety Analysis Reports (SARs) and preparation of Technical Safety Requirements (TSRs). SARs and TSRs may be used as a basis for creation of a Fire Hazards Analysis for activities or as a source of Fire Protection information elements which may satisfy the need for a Fire Hazards Analysis (FHA).

12.7.6 Occupational Safety and Health

An integrated approach should be taken by Occupational Safety and Health Act (OSHA) and the Fire Protection Area to ensure both are current in standards and guidelines associated with the National Fire Protection Association and OSHA.

12.7.7 Management Systems

The Management Systems Functional Area establishes organizational responsibilities and structure and the creation of appropriate implementing policies and procedures to develop and implement a Fire Protection Program. Additionally the Management Systems Functional Area ensures adequate guidance and oversight for the implementation of these policies and procedures, and maintains a commitment of resources to perform the required functions.

12.8 References

12.8.1 Requirement Source Documents

For references, see attached report titled "RIDs by Document X-Reference Listing".

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12.8.2 Reviewed Documents Not Used as Requirement Sources

The following documents were reviewed as requirement sources but were not used in the development of this S/RID:

29 CFR 1926, Code of Federal Regulations, 07/01/95

WAC 212-80, Washington Administrative Code, Fire Protection

WAC 173-303, Washington Administrative Code, Dangerous Waste Regulations

DOE 5480.4, Environmental Protection, Safety, and Health Protection Standards, 01/07/93

DOE 5480.19, Conduct of Operations Requirements For DOE Facilities, 07/07/90 Page Change 1: 05/18/92

DOE 5700.6C, Quality Assurance, 08/21/91

DOE 6430.1A, General Design Criteria, 04/06/89

DOE EH0135 Performance Objectives and Criteria For Technical Safety Appraisals at Department of Energy Facilities and Sites, 06/90

DOE EP/0108, Standard For Fire Protection Of AEC Electronic Computer Data Processing Systems, 01/84

DOE EV-0043, Standard On Fire Protection For Portable Structures, 08/79

DOE/RL-91-28 Rev 1, Hanford Facility Dangerous Waste Permit Application, General Information, Appendix 7A, Hanford Facility Contingency Plant, 05/93

NFPA Codes and Standards

Uniform Fire Code

Uniform Building Code

RIDs by Document X-Reference Listing
Based on 324-FP-SD RID and including all documents.

DOE ORDER 5480. 7A, Fire Protection

RLID 5480. 7, Fire Protection

***** End of RIDs by Document X-Reference Listing *****

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13.0 Packaging and Transportation

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract level S/RID.

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For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

13.1 Management and Administration

The 324 Building personnel will comply with all contractually imposed Packaging and Transportation (P&T) regulations, unless specifically exempted by DOE. The FDH Contract level P&T Functional Area identifies the WHC-CM-2-14 manual, Hazardous Material Packaging and Shipping, as the implementing document for all transportation and packaging related requirements.

The Code of Federal Regulations are living documents that continuously undergo change. When applied, the most current publication of the CFR concerned will be referenced to ensure all recent changes are included.

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13.2 Packaging and Transportation Operations

13.2.1 Packaging

REQUIREMENT SOURCE: 49 CFR 171, Dated 10-01-95, Part 1(c)

Any person who, under contract with any department, agency, or instrumentality of the executive, legislative, or judicial branch of the Federal Government, transports, or causes to be transported or shipped, a hazardous material or manufactures, fabricates, marks, maintains, reconditions, repairs, or tests a package or container which is represented, marked, certified, or sold by such person as qualified for use in the transportation of hazardous materials shall be subject to and comply with all provisions of the Federal hazardous material transportation law, all orders and regulations issued thereunder, and all other substantive and procedural requirements of Federal, State, and local governments and Indian tribes (except any such requirements that have been preempted by the Federal hazardous material transportation law or any other Federal law), in the same manner and to the same extent as any person engaged in such activities that are in or affect commerce is subject to such provisions, orders, regulations, and requirements.

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 12

Exceptions for shipment of waste materials.

(a) Open head drums. If a hazardous material that is a hazardous waste is required by this subchapter to be shipped in a closed head drum (i.e., a drum with a 7.0 cm (3 inches) or less bung opening) and the hazardous waste contains solids or semisolids that make its placement in a closed head drum impracticable, an equivalent (except for closure) open head drum may be used for the hazardous waste.

(b) Lab packs.

(1) Waste materials classed as Class or Division 3, 4.1, 4.2, 4.3, 5.1, 6.1, 8, or 9 are excepted from the specification packaging requirements of this subchapter for combination packagings if packaged in accordance with this paragraph and transported for disposal or recovery by highway only. In addition, a generic description from the §172.101 Table may be used in place of specific chemical names, when two or more chemically compatible waste materials in the same hazard class are packaged in the same outside packaging.

(2) Additional packaging requirements are as follows:

(i) The outer packaging must be a UN 1A2 or UN 1B2 metal drum, a UN 1D plywood drum, a UN 1G fiber drum or a UN 1H2 plastic drum tested and marked at least for the Packing Group III performance level for liquids or solids;

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- (ii) The inner packagings must be either glass, not exceeding 4 L (1 gallon) rated capacity, or metal or plastic, not exceeding 20 L (5.3 gallons) rated capacity;
 - (iii) Each outer packaging may contain only one class of hazardous material;
 - (iv) Inner packagings containing liquid must be surrounded by a chemically compatible absorbent material in sufficient quantity to absorb the total liquid contents; and
 - (v) Gross weight of the complete package may not exceed 205 kg (452 lbs).
- (3) Prohibited materials. Materials meeting the definition of Division 6.1, Packing Group I, or Division 4.2, Packing Group I, and bromine pentafluoride; bromine trifluoride; chloric acid; and oleum (fuming sulfuric acid) may not be packaged or described under the provisions of this paragraph.
- (c) Reuse of packagings. A previously used packaging may be reused for the shipment of hazardous waste to designated facilities, not subject to the reconditioning and reuse provisions contained in §173.28 and part 178 of this subchapter, under the following conditions:
- (1) Except as authorized by this paragraph, the waste must be packaged in accordance with this part and offered for transportation in accordance with the requirements of this subchapter.
 - (2) Transportation is performed by highway only.
 - (3) A package is not offered for transportation less than 24 hours after it is finally closed for transportation, and each package is inspected for leakage and is found to be free from leaks immediately prior to being offered for transportation.
 - (4) Each package is loaded by the shipper and unloaded by the consignee, unless the motor carrier is a private or contract carrier.
 - (5) The packaging may be used only once under this paragraph and may not be used again for shipment of hazardous materials except in accordance with §173.28.
- (d) Technical names for n.o.s. descriptions. The requirements for the inclusion of technical names for n.o.s. descriptions on shipping papers and package markings, §§172.203 and 172.301 of this subchapter, respectively, do not apply to packagings prepared in accordance with paragraph (b) of this section, except as follows:
- (1) Packages containing materials meeting the definition of a hazardous substance must be described as required in §172.203(c) of this subchapter and marked as required in §172.324 of this subchapter; and

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(2) Packages containing hazardous materials subject to the provisions of §172.203(m) of this subchapter must be described in accordance with §172.203(m) of this subchapter.

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 24

General requirements for packagings and packages.

(a) Applicability. Except as otherwise provided in this subchapter, the provisions of this section apply to--

- (1) Bulk and non-bulk packagings;
- (2) New packagings and packagings which are reused; and
- (3) Specification and non-specification packagings.

(b) Each package used for the shipment of hazardous materials under this subchapter shall be designed, constructed, maintained, filled, its contents so limited, and closed, so that under conditions normally incident to transportation--

(1) Except as otherwise provided in this subchapter, there will be no identifiable (without the use of instruments) release of hazardous materials to the environment;

(2) The effectiveness of the package will not be substantially reduced; for example, impact resistance, strength, packaging compatibility, etc. must be maintained for the minimum and maximum temperatures encountered during transportation;

(3) There will be no mixture of gases or vapors in the package which could, through any credible spontaneous increase of heat or pressure, significantly reduce the effectiveness of the packaging.

(c) Authorized packagings. A packaging is authorized for a hazardous material only if--

(1) The packaging is prescribed or permitted for the hazardous material in a packaging section specified for that material in Column 8 of the §172.101 Table and conforms to applicable requirements in the special provisions of Column 7 of the §172.101 Table and, for specification packagings (but not including UN standard packagings manufactured outside the United States), the specification requirements in parts 178 and 179 of this subchapter; or

(2) The packaging is permitted under, and conforms to, provisions contained in §§171.11, 171.12, 171.12a, 173.3, 173.4, 173.5, 173.7, 173.27, or 176.11 of this subchapter.

(d) Specification packagings and UN standard packagings manufactured outside the U.S.--

(1) Specification packagings. A specification packaging, including a UN standard packaging

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manufactured in the United States, must conform in all details to the applicable specification or standard in part 178 or part 179 of this subchapter.

(2) UN standard packagings manufactured outside the United States. A UN standard packaging manufactured outside the United States, in accordance with national or international regulations based on the UN Recommendations on the Transport of Dangerous Goods, may be imported and used and is considered to be an authorized packaging under the provisions of paragraph (c)(1) of this section, subject to the following conditions and limitations:

(i) The packaging fully conforms to applicable provisions in the UN Recommendations on the Transport of Dangerous Goods and the requirements of this subpart, including reuse provisions;

(ii) The packaging is capable of passing the prescribed tests in part 178 of this subchapter applicable to that standard; and

(iii) The competent authority of the country of manufacture provides reciprocal treatment for UN standard packagings manufactured in the U.S.

(e) Compatibility.

(1) Even though certain packagings are specified in this part, it is, nevertheless, the responsibility of the person offering a hazardous material for transportation to ensure that such packagings are compatible with their lading. This particularly applies to corrosivity, permeability, softening, premature aging and embrittlement.

(2) Packaging materials and contents must be such that there will be no significant chemical or galvanic reaction between the materials and contents of the package.

(3) Plastic packagings and receptacles.

(i) Plastic used in packagings and receptacles must be of a type compatible with the lading and may not be permeable to an extent that a hazardous condition is likely to occur during transportation, handling or refilling.

(ii) Each plastic packaging or receptacle which is used for liquid hazardous materials must be capable of withstanding without failure the procedure specified in Appendix B of this part ("Procedure for Testing Chemical Compatibility and Rate of Permeation in Plastic Packagings and Receptacles"). The procedure specified in appendix B of this part must be performed on each plastic packaging or receptacle used for Packing Group I materials. The maximum rate of permeation of hazardous lading through or into the plastic packaging or receptacles may not exceed 0.5 percent for materials meeting the definition of a Division 6.1 material according to §173.132 and 2.0 percent for other hazardous materials, when subjected to a temperature no lower than--

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- (A) 18 C (64 F) for 180 days in accordance with Test Method 1 in appendix B of this part;
 - (B) 50 C (122 F) for 28 days in accordance with Test Method 2 in appendix B of this part; or
 - (C) 60 C (140 F) for 14 days in accordance with Test Method 3 in appendix B of this part.
- (iii) Alternative procedures or rates of permeation are permitted if they yield a level of safety equivalent to or greater than that provided by paragraph (e)(3)(ii) of this section and are specifically approved by the Associate Administrator for Hazardous Materials Safety.
- (4) Mixed contents. Hazardous materials may not be packed or mixed together in the same outer packaging with other hazardous or nonhazardous materials if such materials are capable of reacting dangerously with each other and causing--
- (i) Combustion or dangerous evolution of heat;
 - (ii) Evolution of flammable, poisonous, or asphyxiant gases; or
 - (iii) Formation of unstable or corrosive materials.
- (5) Packagings used for solids, which may become liquid at temperatures likely to be encountered during transportation, must be capable of containing the hazardous material in the liquid state.
- (f) Closures.
- (1) Closures on packagings shall be so designed and closed that under conditions (including the effects of temperature and vibration) normally incident to transportation--
 - (i) Except as provided in paragraph (g) of this section, there is no identifiable release of hazardous materials to the environment from the opening to which the closure is applied; and
 - (ii) The closure is secure and leakproof.
 - (2) Except as otherwise provided in this subchapter, a closure (including gaskets or other closure components, if any) used on a specification packaging must conform to all applicable requirements of the specification.
 - (g) Venting. Venting of packagings, to reduce internal pressure which may develop by the evolution of gas from the contents, is permitted only when--
 - (1) Transportation by aircraft is not involved;
 - (2) Except as otherwise provided in this subchapter, the evolved gases are not poisonous, likely to create a flammable mixture with air or be an asphyxiant under normal conditions of transportation;

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- (3) The packaging is designed so as to preclude an unintentional release of hazardous materials from the receptacle; and
- (4) For shipments in bulk packagings, venting is authorized for the specific hazardous material by a special provision in the §172.101 Table or by the applicable bulk packaging specification in part 178 of this subchapter.
- (h) Outage and filling limits--
- (1) General. When filling packagings and receptacles for liquids, sufficient ullage (outage) must be left to ensure that neither leakage nor permanent distortion of the packaging or receptacle will occur as a result of an expansion of the liquid caused by temperatures likely to be encountered during transportation. Requirements for outage and filling limits for non-bulk and bulk packagings are specified in §§173.24a(d) and 173.24b(a), respectively.
- (2) Compressed gases and cryogenic liquids. Filling limits for compressed gases and cryogenic liquids are specified in §§173.301 through 173.306 for cylinders and §§173.314 through 173.319 for bulk packagings.
- (i) Air transportation. Packages offered or intended for transportation by aircraft must conform to the general requirements for transportation by aircraft in §173.27, except as provided in §171.11 of this subchapter.

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 28

Author's Note: All of items (c) and (d) not applicable.

Reuse, reconditioning and remanufacture of packagings.

- (a) General. Packagings and receptacles used more than once must be in such condition, including closure devices and cushioning materials, that they conform in all respects to the prescribed requirements of this subchapter. Before reuse, each packaging must be inspected and may not be reused unless free from incompatible residue, rupture, or other damage which reduces its structural integrity.
- (b) Reuse of non-bulk packaging. A non-bulk packaging used more than once must conform to the following provisions and limitations:
- (1) A non-bulk packaging which, upon inspection, shows evidence of a reduction in integrity may not be reused unless it is reconditioned in accordance with paragraph (c) of this section.
- (2) Before reuse, packagings subject to the leakproofness test with air prescribed in §178.604 of

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this subchapter shall be--

(i) Retested without failure in accordance with §178.604 of this subchapter using an internal air pressure (gauge) of at least 48 kPa (7.0 psi) for Packing Group I and 20 kPa (3.0 psi) for Packing Group II and Packing Group III; and

(ii) Marked with the letter "L", with the name and address or symbol of the person conducting the test, and the last two digits of the year the test was conducted. Symbols, if used, must be registered with the Associate Administrator for Hazardous Materials Safety.

(3) Packagings made of paper, plastic film, or textile are not authorized for reuse;

(4) Metal and plastic drums and jerricans used as single packagings or the outer packagings of composite packagings are authorized for reuse only when they are marked in a permanent manner (e.g., embossed) in millimeters with the nominal (for metal packagings) or minimum (for plastic packagings) thickness of the packaging material, as required by §178.503(a)(9) of this subchapter, and conform to the following minimum thickness criteria:

{REFER TO 49CFR173.28(b)(4) for table}

(5) Plastic inner receptacles of composite packagings must have a minimum thickness of 1.0 mm (0.039 inch).

(6) A previously used non-bulk packaging may be reused for the shipment of hazardous waste, not subject to the reconditioning and reuse provisions of this section, in accordance with §173.12(c).

(7) Notwithstanding the provisions of paragraph (b)(2) of this section, a packaging otherwise authorized for reuse may be reused without being leakproofness tested with air provided the packaging--

(i) Is refilled with a material which is compatible with the previous lading:

(ii) Is refilled and offered for transportation by the original filler;

(iii) Is transported in a transport vehicle or freight container under the exclusive use of the refiller of the packaging; and

(iv) Is constructed of--

(A) Stainless steel, monel or nickel with a thickness not less than one and one-half times the minimum thickness prescribed in paragraph (b)(4) of this section;

(B) Plastic, provided the packaging is not refilled for reuse on a date more than five years from

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the date of manufacture marked on the packaging in accordance with §178.503(a)(6) of this subchapter; or

(C) Another material or thickness, when approved under the conditions established by the Associate Administrator for Hazardous Materials Safety for reuse without retesting.

(c) Reconditioning of non-bulk packaging.

(1) For the purpose of this subchapter, reconditioning of metal drums is:

(i) Cleaning to base material of construction, with all former contents, internal and external corrosion, and any external coatings and labels removed;

(ii) Restoring to original shape and contour, with chimes (if any) straightened and sealed, and all non-integral gaskets replaced: and

(iii) Inspecting after cleaning but before painting, Packagings that have visible pitting, significant reduction in material thickness, metal fatigue, damaged threads or closures, or other significant defects, must be rejected.

(2) For the purpose of this subchapter, reconditioning of a non-bulk packaging other than a metal drum or a UN 1H1 plastic drum is restoring the packaging by repair, or replacement of non-integral packaging components (such as removable gaskets, closure devices, cushioning material, etc.) to a condition such that it conforms in all respects with the prescribed requirements of this subchapter. Packagings which have significant defects which cannot be repaired may not be reused. For UN 1H1 plastic drum, replacing a removable gasket or closure device with a replacement which provides equivalent performance does not constitute reconditioning.

(3) A person who reconditions a packaging manufactured and marked under the provisions of subpart L of part 178 of this subchapter, shall mark that packaging as required by §178.503(c) and (d) of this subchapter. The marking is the certification of the reconditioner that the packaging conforms to the standard for which it is marked and that all functions performed by the reconditioner which are prescribed by this subchapter have been performed in compliance with this subchapter.

(4) The markings applied by the reconditioner may be different from those applied by the manufacturer at the time of original manufacture, but may not identify a greater performance capability than that for which the original design type had been tested (for example, the reconditioner may mark a drum which was originally marked as 1A1/Y1.8 as 1A1/Y1.2 or 1A1/Z2.0).

(d) Remanufacture of non-bulk packagings. For the purpose of this subchapter, remanufacture is the conversion of a non-specification, non-bulk packaging to a DOT specification or U.N.

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standard, the conversion of a packaging meeting one specification or standard to another specification or standard (for example, conversion of 1A1 non-removable head drums to 1A2 removable head drums) or the replacement of integral structural packaging components (such as non-removable heads on drums). A person who remanufactures a non-bulk packaging to conform to a specification or standard in part 178 of this subchapter is subject to the requirements of part 178 of this subchapter as a manufacturer.

(e) Non-reusable containers. A packaging marked as NRC according to the DOT specification or UN standard requirements of part 178 of this subchapter may be reused for the shipment of any material not required by this subchapter to be shipped in a DOT specification or UN standard packaging.

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 417

Authorized fissile materials packages.

(a) Except as provided in §173.453, fissile materials containing not more than A1 or A2 as appropriate, must be packaged in one of the following packagings:

(1) DOT Specification 6L (§178.352 of this subchapter), metal packaging, for materials prescribed in paragraph (b)(1) of this section.

(2) DOT Specification 6M (§178.354 of this subchapter), metal packaging, for materials prescribed in paragraph (b)(2) of this section.

(3) Any packaging listed in §173.415, limited to the Class 7 (radioactive) materials specified in 10 CFR part 71, subpart C.

(4) Any other Type A or Type B, Type B(U), or Type B(M) packaging for fissile Class 7 (radioactive) materials that also meets the applicable standards for fissile materials in 10 CFR part 71 .

(5) Any other Type A or Type B, Type B(U), or Type B(M) packaging that also meets the applicable requirements for fissile material packaging in Section V of the International Atomic Energy Agency "Regulations for the Safe Transport of Radioactive Materials, Safety Series No. 6," and for which the foreign competent authority certificate has been revalidated by the U.S. Competent Authority, in accordance with §173.473. These packages are authorized only for export and import shipments.

(6) A 55-gallon 1A2 steel drum, meeting the applicable packaging testing requirements of subpart M of Part 178 of this subchapter at the packing group I performance level, subject to the following conditions:

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- (i) The quantity may not exceed 350 grams of uranium-235 in any non-pyrophoric form, enriched to any degree in the uranium-235 isotope;
- (ii) Each drum must have a minimum 18 gauge body and bottom head and 16 gauge removable top head with one or more corrugations in the cover near the periphery;
- (iii) Closure must conform to §178.352 of this subchapter;
- (iv) At least four equally spaced 12 millimeter (0.5 inch) diameter vent holes must be provided on the sides of the drum near the top, each covered with weatherproof tape; or equivalent device;
- (v) Appropriate primary, inner containment of the contents and sufficient packaging material, such as plastic or metal jars or cans, must be provided such that Specification 7A (§178.350 of this subchapter) provisions are satisfied by the inner packaging;
- (vi) Each inner container must be capable of venting if subjected to the thermal test described in 10 CFR part 71 ;
- (vii) Liquid contents must be packaged in accordance with §173.412(j) and (k); and
- (viii) The maximum weight of contents, including internal packaging, may not exceed 91 kilograms (200 pounds) with fissile material content limited as shown in Table 2:

{REFER TO 49CFR173.417(a)(6)(viii) table}
- (7) Any metal cylinder that meets the requirements of §173.415 and §178.350 of this subchapter for Specification 7A Type A packaging may be used for the transport of residual "heels" of enriched solid uranium hexafluoride without a protective overpack in accordance with Table 3, as follows:

{REFER TO 49CFR173.417(a)(7) table}
- (8) DOT Specification 20PF-1, 20PF-2, or 20PF-3 (§178.356 of this subchapter), or Specification 21PF-1A, 21PF-1B, or 21PF-2 (§178.358 of this subchapter) phenolic-foam insulated overpack with snug fitting inner metal cylinders, meeting all requirements of §§173.24, 173.410, 173.412, and 173.420 and the following:
 - (i) Handling procedures and packaging criteria must be in accordance with DOE Report ORO-651 or ANSI N14.1.
 - (ii) Quantities of uranium hexafluoride are authorized as shown in Table 6 of this section, with each package assigned a minimum transport index as also shown.

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(b) Fissile Class 7 (radioactive) materials with radioactive content exceeding A1 or A2 must be packaged in one of the following packagings:

(1) DOT Specification 6L (§178.352 of this subchapter), metal packaging. These packages may contain only uranium-235, plutonium-239, or plutonium-241, as metal, oxide, or compounds that do not decompose at temperatures up to 149 C (300 F). Radioactive decay heat output may not exceed 5 watts. Class 7 (radioactive) materials in normal form must be packaged in one or more tightly sealed metal or polyethylene bottles within a DOT Specification 2R (§178.360 of this subchapter) containment vessel. Authorized contents are limited in accordance with Table 4, as follows:

{REFER TO 49CFR173.417(b)(1)}

(2) DOT Specification 6M (§178.354 of this subchapter), metal packaging. These packages must contain only solid Class 7 (radioactive) materials that will not decompose at temperatures up to 121 C (250 F). Radioactive decay heat output may not exceed 10 watts. Class 7 (radioactive) materials in other than special form must be packaged in one or more tightly sealed metal cans or polyethylene bottles within a DOT Specification 2R (§178.360 of this subchapter) containment vessel.

(i) For fissile material with a criticality TI equal to 0.0, packages are limited to the following amounts of fissile Class 7 (radioactive) materials: 1.6 kilograms of uranium-235; 0.9 kilograms of plutonium (except that due to the 10-watt thermal decay heat limitation, the limit for plutonium-238 is 0.02 kilograms); and 0.5 kilograms of uranium-233. The maximum ratio of hydrogen to fissile material may not exceed three, including all of the sources of hydrogen within the DOT Specification 2R containment vessel.

(ii) Maximum quantities of fissile material and other restrictions for materials with a criticality of greater than 0.0 are given in Table 5. The minimum transport index to be assigned per package and, for fissile material, controlled shipments, the allowable number of similar packages per conveyance and per transport vehicle are shown in Table 5. Where a maximum ratio of hydrogen to fissile material is specified in Table 5, only the hydrogen interspersed with the fissile material must be considered. For a uranium-233 shipment, the maximum inside diameter of the inner containment vessel may not exceed 12.1 centimeters (4.75 inches). Where necessary, a tight fitting steel insert must be used to reduce a larger diameter inner containment vessel specified in §178.354 of this subchapter to the 12.1 centimeter (4.75 inch) limit. Table 5 is as follows:

{REFER TO 49CFR173.417(b)(2)(ii) table}

(3) Type B, or Type B(U), or B(M) packaging that meets the standards for packaging of fissile materials in 10 CFR part 71, and is approved by the U.S. Nuclear Regulatory Commission and used in accordance with §173.471.

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- (4) Type B, B(U), or B(M) packaging that meets the applicable requirements for fissile Class 7 (radioactive) materials in Section V of the IAEA "Regulations for the Safe Transport of Radioactive Materials, Safety Series No. 6" and for which the foreign competent authority certificate has been revalidated by the U.S. Competent Authority in accordance with §173.473. These packagings are authorized only for import and export shipments.
- (5) DOT Specifications 20PF-1, 20PF-2, or 20PF-3 (§178.356 of this subchapter), or DOT Specifications 21PF-1A or 21PF-1B (§178.358 of this subchapter) phenolic-foam insulated overpack with snug fitting inner metal cylinders, meeting all requirements of §§173.24, 173.410, and 173.412, and the following:
- (i) Handling procedures and packaging criteria must be in accordance with DOE Report ORO-651 or ANSI N14.1; and
- (ii) Quantities of uranium hexafluoride are authorized as shown in Table 6, with each package assigned a minimum transport index as also shown:
- {REFER TO 49CFR173.417(b)(5)(ii) table}

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 453

Fissile materials--exceptions.

The requirements of §§173.457 and 173.459 do not apply to:

- (a) A package containing 15 grams or less of fissile radionuclides. If the material is transported in bulk, the quantity limitation applies to the conveyance.
- (b) A package containing homogeneous solutions or mixtures where:
- (1) The minimum ratio of the number of hydrogen atoms to the number of atoms of fissile radionuclides (H/X) is 5200;
- (2) The maximum concentration of fissile radionuclides is 5 grams per liter; and
- (3) The maximum mass of fissile radionuclides in the package is 500 grams, except that for a mixture in which the total mass of plutonium and uranium-233 does not exceed 1% of the mass of uranium-235, the limit is 800 grams of uranium-235. If the material is transported in bulk, the quantity limitations apply to the conveyance.
- (c) A package containing uranium enriched in uranium-235 to a maximum of 1% by mass, and mixed with a total plutonium and uranium-233 content of up to 1% of the mass of uranium-235, if the fissile radionuclides are distributed homogeneously throughout the package contents, and do

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not form a lattice arrangement within the package.

- (d) A package containing not more than 5 grams of fissile radionuclides in any 10 liter volume, provided that the material is contained in packages that will maintain the limitation on fissile radionuclide distribution during normal conditions of transport.
- (e) A package containing one kilogram or less of plutonium of which 20% or less by mass may consist of plutonium-239, plutonium-241, or any combination of those radionuclides.
- (f) A package containing liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2% by mass, with total plutonium and uranium-233 content not exceeding 0.1% of the mass of uranium-235 with a nitrogen-to-uranium atomic ratio (N/U) of 2.

13.2.1.1 Type A Packaging

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 415

Authorized Type A packages.

The following packages are authorized for shipment if they do not contain quantities exceeding A1 or A2 as appropriate:

- (a) DOT Specification 7A (§178.350 of this subchapter) Type A general packaging. Each offeror of a Specification 7A package must maintain on file for at least one year after the latest shipment, and shall provide to DOT on request, complete documentation of tests and an engineering evaluation or comparative data showing that the construction methods, packaging design, and materials of construction comply with that specification. Use of Specification 7A packagings designed in accordance with the requirements of §178.350 of this subchapter in effect on June 30, 1983 (see 49 CFR Part 178 revised as of October 1, 1982), is not authorized after April 1, 1997.
- (b) Any other Type A packaging that also meets the applicable standards for fissile materials in 10 CFR Part 71 and is used in accordance with §173.471.
- (c) Any Type B, B(U) or B(M) packaging authorized pursuant to §173.416.
- (d) Any foreign-made packaging that meets the standards in IAEA "Safety Series No. 6" and bears the marking "Type A" and was used for the import of Class 7 (radioactive) materials. Such packagings may be subsequently used for domestic and export shipments of Class 7 (radioactive) materials provided the offeror obtains the applicable documentation of tests and engineering evaluations and maintains the documentation on file in accordance with paragraph (a) of this section. These packagings must conform with requirements of the country of origin (as indicated by the packaging marking) and the IAEA regulations applicable to Type A packagings.

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13.2.1.2 Type B Packaging

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 413

Requirements for Type B packages.

Except as provided in §173.416, each Type B(U) or Type B(M) package must be designed and constructed to meet the applicable requirements specified in 10 CFR Part 71.

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 416

Authorized Type B packages.

Each of the following packages is authorized for shipment of quantities exceeding A1 or A2, as appropriate:

- (a) Any Type B, Type B(U) or Type B(M) packaging that meets the applicable requirements of 10 CFR Part 71 and that has been approved by the U.S. Nuclear Regulatory Commission may be shipped pursuant to § 173.471.
- (b) Any Type B, B(U) or B(M) packaging that meets the applicable requirements of the regulations of the International Atomic Energy Agency (IAEA) in its "Regulations for the Safe Transport of Radioactive Materials, Safety Series No. 6" and for which the foreign competent authority certificate has been revalidated by DOT pursuant to § 173.473. These packagings are authorized only for export and import shipments.
- (c) DOT Specification 6M (§ 178.354 of this subchapter) metal packaging, only for solid or gaseous Class 7 (radioactive) materials that will not undergo pressure-generating decomposition at temperatures up to 121°C (250°F) and that do not generate more than 10 watts of radioactive decay heat.
- (d) For contents in other than special form; DOT Specification 20WC (§ 178.362 of this subchapter), wooden protective jacket, when used with a single, snug-fitting inner DOT Specification 2R (§ 178.360 of this subchapter). For liquid contents, the inner packaging must conform to § 173.412(j) and (k).
- (e) For contents in special form only; DOT Specification 20WC (§ 178.362 of this subchapter), wooden protective jacket, with a single snug-fitting inner Type A packaging that has a metal outer wall and conforms to § 178.350 of this subchapter. Radioactive decay heat may not exceed 100 watts.
- (f) For contents in special form only; DOT Specification 21WC (§ 178.364 of this subchapter), wooden protective overpack, with a single inner DOT Specification 2R (§ 178.360 of this

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subchapter). Contents must be loaded within the inner packaging in such a manner as to prevent loose movement during transportation. The inner packaging must be securely positioned and centered within the overpack so that there will be no significant displacement of the inner packaging if subjected to the 9 meter (30 feet) drop test described in 10 CFR part 71.

13.2.1.3 Low Specific Activity Packaging

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 427

Transport requirements for low specific activity (LSA) Class 7 (radioactive) materials and surface contaminated objects (SCO).

(a) In addition to other applicable requirements specified in this subchapter, low specific activity (LSA) materials and surface contaminated objects (SCO), unless excepted by paragraph (d) of this section, must be packaged in accordance with paragraph (b) or (c) of this section and must be transported in accordance with the following conditions:

- (1) The external dose rate must not exceed an external radiation level of 10 mSv/h (1 rem/h) at 3 meters from the unshielded material;
- (2) The quantity of LSA and SCO material in any single conveyance must not exceed the limits specified in Table 9;
- (3) LSA material and SCO that are or contain fissile material must meet the applicable requirements of §§173.451 and 173.467;
- (4) Packages must meet the contamination control limits specified in §173.443;
- (5) External radiation levels must comply with §173.441; and
- (6) For LSA material and SCO required by this section to be consigned as exclusive use:
 - (i) Shipments must be loaded by the consignor and unloaded by the consignee from the conveyance or freight container in which originally loaded;
 - (ii) There must be no loose Class 7 (radioactive) material in the conveyance, however, when the conveyance is the packaging there must be no leakage of Class 7 (radioactive) material from the conveyance;
 - (iii) Packages must be braced so as to prevent shifting of lading under conditions normally incident to transportation;
 - (iv) Specific instructions for maintenance of exclusive use shipment controls must be provided by

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the offeror to the carrier. Such instructions must be included with the shipping paper information;

- (v) Except for shipments of unconcentrated uranium or thorium ores, the transport vehicle must be placarded in accordance with subpart F of Part 172 of this subchapter;
- (vi) For domestic transportation only, packages are excepted from the marking and labeling requirements of this subchapter. However, the exterior of each nonbulk package must be stenciled or otherwise marked "Radioactive--LSA" or "Radioactive--SCO", as appropriate, and nonbulk packages that contain a hazardous substance must also be stenciled or otherwise marked with the letters "RQ" in association with the above description; and
- (vii) Except when transported in an industrial package in accordance with Table 8, transportation by aircraft is prohibited.
- (b) Except as provided in paragraph (c) of this section, LSA material and SCO must be packaged as follows:
 - (1) In an industrial package (IP-1, IP-2 or IP-3; §173.411), subject to the limitations of Table 8;
 - (2) For domestic transportation only, in a DOT Specification 7A (§178.350 of this subchapter) Type A package. The requirements of §173.412(a), (b), (c) and (k) do not apply;
 - (3) For domestic transportation only, in a strong, tight package that prevents leakage of the radioactive content under normal conditions of transport. In addition to the requirements of paragraph (a) of this section, the following requirements must be met:
 - (i) The shipment must be exclusive use;
 - (ii) The quantity of Class 7 (radioactive) material in each packaging may not exceed an A2 quantity;
 - (4) For domestic transportation only, in a packaging that complies with the provisions of 10 CFR 71.52, and is transported in exclusive use; or
 - (5) Any Type B, B(U) or B(M) packaging authorized pursuant to §173.416.
- (c) LSA-I and SCO-I (see §173.403), unless packaged in accordance with paragraph (b) of this section, must be packaged in bulk packagings in accordance with this paragraph. The shipment must be, in addition to complying with the applicable requirements of paragraph (a) of this section, exclusive use:
 - (1) Solids. Packages must be strong tight packagings, meeting the requirements of subpart B of this Part. The requirements of §173.410 do not apply.

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(2) Liquids. Liquids must be transported in the following packagings:

(i) Specification 103CW, 111A60W7 (§§179.200,179.201,179.202 of this subchapter) tank cars. Bottom openings in tanks are prohibited; or

(ii) Specification MC 310, MC 311, MC 312, MC 331 or DOT 412 (§178.348 or §178.337 of this subchapter) cargo tank motor vehicles. Bottom outlets are not authorized. Trailer-on-flat-car service is not authorized.

(d) Except for transportation by aircraft, LSA material and SCO that conform to the provisions specified in 10 CFR 20.2005 are excepted from all requirements of this subchapter pertaining to Class 7 (radioactive) materials when offered for transportation for disposal or recovery. A material which meets the definition of another hazard class is subject to the provisions of this subchapter relating to that hazard class.

(e) LSA and SCO that exceed the packaging limits in this section must be packaged in accordance with 10 CFR part 71 .

(f) Tables 8 and 9 are as follows:

{REFER TO 49CFR173.427(f) table}

13.2.1.4 Limited Quantity Packaging

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 421

Excepted packages for limited quantities of Class 7 (radioactive) materials.

(a) A Class 7 (radioactive) material whose activity per package does not exceed the limits specified in §173.425 and its packaging are excepted from the specification packaging, marking, labeling and, if not a hazardous substance or hazardous waste, the shipping paper and certification requirements of this subchapter and requirements of this subpart if:

(1) Each package meets the general design requirements of §173.410;

(2) The radiation level at any point on the external surface of the package does not exceed 0.005 mSv/hour (0.5 mrem/ hour);

(3) The nonfixed (removable) radioactive surface contamination on the external surface of the package does not exceed the limits specified in §173.443(a);

(4) The outside of the inner packaging or, if there is no inner packaging, the outside of the

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packaging itself bears the marking "Radioactive";

- (5) Except as provided in §173.426, the package does not contain more than 15 grams of uranium-235; and
 - (6) The material is otherwise prepared for shipment as specified in accordance with §173.422.
- (b) A limited quantity of Class 7 (radioactive) material that is a hazardous substance or a hazardous waste, is not subject to the provisions in §172.203(d) or §172.204(c)(4) of this subchapter.

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 422

Additional requirements for excepted packages containing Class 7 (radioactive) materials.

- (a) Except for materials subject to the shipping paper requirements of subpart C of Part 172 of this subchapter, excepted packages are prepared for shipment under the provisions of § 173.421, § 173.424, § 173.426, or § 173.428 must be certified as being acceptable for transportation by having a notice enclosed in or on the package, included with the packing list, or otherwise forwarded with the package. This notice must include the name of the consignor or consignee and one of the following statements, as appropriate:
- (1) "This package conforms to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910";
 - (2) "This package conforms to the conditions and limitations specified in 49 CFR 173.424 for radioactive material, excepted package-instruments or articles, UN2910";
 - (3) "This package conforms to the conditions and limitations specified in 49 CFR 173.426 for radioactive material, excepted package-articles manufactured from natural or depleted uranium, or natural thorium, UN2910"; or
 - (4) "This package conforms to the conditions and limitations specified in 49 CFR 173.428 for radioactive material, excepted package-empty package, UN2910."
- (b) An excepted package of Class 7 (radioactive) material that is classed as Class 7 and is prepared for shipment under the provisions of § 173.421, § 173.423, § 173.424, § 173.426, or § 173.428 is not subject to the requirements of this subchapter, except for-
- (1) Sections 171.15, 171.16, 174.750, 176.710, and 177.861 of this subchapter, pertaining to the reporting of incidents and decontamination, when transported by a mode other than air;
 - (2) Sections 171.15, 171.16, 175.45, and 175.700(b) of this subchapter pertaining to the reporting

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of incidents and decontamination when transported by aircraft; and

(3) The training requirements of subpart H of part 172 of this subchapter and, for materials that meet the definition of a hazardous substance or a hazardous waste, the shipping paper requirements of subpart C of Part 172 of this subchapter.

13.2.1.5 Instruments and Articles

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 424

Excepted packages for radioactive instruments and articles.

A radioactive instrument or article and its packaging is excepted from the specification packaging, shipping paper and certification, marking and labeling requirements of this subchapter and requirements of this subpart, if:

- (a) Each package meets the general design requirements of §173.410;
- (b) The activity of the instrument or article does not exceed the relevant limit listed in Table 7 in §173.425;
- (c) The total activity per package does not exceed the relevant limit listed in Table 7 in §173.425;
- (d) The radiation level at 10 cm (4 in) from any point on the external surface of any unpackaged instrument or article does not exceed 0.1 mSv/hour (10 mrem/hour);
- (e) The radiation level at any point on the external surface of a package bearing the article or instrument does not exceed 0.005 mSv/hour (0.5 mrem/hour), or, for exclusive use domestic shipments, 0.02 mSv (2 mrem/hour);
- (f) The nonfixed (removable) radioactive surface contamination on the external surface of the package does not exceed the limits specified in §173.443(a);
- (g) Except as provided in §173.426, the package does not contain more than 15 grams of uranium-235; and
- (h) The package is otherwise prepared for shipment as specified in §173.422.

13.2.1.6 Empty Packaging

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 29

Empty packagings.

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(a) General. Except as otherwise provided in this section, an empty packaging containing only the residue of a hazardous material shall be offered for transportation and transported in the same manner as when it previously contained a greater quantity of that hazardous material.

(b) Notwithstanding the requirements of paragraph (a) of this section, an empty packaging is not subject to any other requirements of this subchapter if it conforms to the following provisions:

(1) Any hazardous material shipping name and identification number markings, and any hazard warning labels or placards are removed, obliterated, or securely covered in transportation. This provision does not apply to transportation in a transport vehicle or a freight container if the packaging is not visible during transportation and the packaging is loaded by the shipper and unloaded by the shipper or consignee;

(2) The packaging--

(i) Is unused;

(ii) Is sufficiently cleaned of residue and purged of vapors to remove any potential hazard;

(iii) Is refilled with a material which is not hazardous to such an extent that any residue remaining in the packaging no longer poses a hazard; or

(iv) Contains only the residue of--

(A) An ORM-D material; or

(B) A non-flammable gas with no subsidiary hazard at an absolute pressure less than 276 kPa (40 psia); at 21 C (70 F); and

(3) Any material contained in the packaging does not meet the definitions in §171.8 of this subchapter for a hazardous substance, a hazardous waste, or a marine pollutant.

(c) A non-bulk packaging containing only the residue of a hazardous material covered by Table 2 of §172.504 of this subchapter--

(1) Does not have to be included in determining the applicability of the placarding requirements of subpart F of part 172 of this subchapter; and

(2) Is not subject to the shipping paper requirements of this subchapter when collected and transported by a contract or private carrier for reconditioning, remanufacture or reuse.

(d) Notwithstanding the stowage requirements in Column 10a of the §172.101 Table for

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transportation by vessel, an empty drum or cylinder may be stowed on deck or under deck.

(e) Specific provisions for describing an empty packaging on a shipping paper appear in §172.203(e) of this subchapter.

(f) An empty tank car must conform to the placarding requirements specified in § 172.510(c) of this subchapter.

(g) A package which contains a residue of an elevated temperature material may remain marked in the same manner as when it contained a greater quantity of the material even though it no longer meets the definition in §171.8 of this subchapter for an elevated temperature material.

13.2.1.7 Hazardous Materials

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 22

Shipper's responsibility.

(a) Except as otherwise provided in this part, a person may offer a hazardous material for transportation in a packaging or container required by this part only in accordance with the following:

(1) The person shall class and describe the hazardous material in accordance with Parts 172 and 173 of this subchapter, and

(2) The person shall determine that the packaging or container is an authorized packaging, including part 173 requirements, and that it has been manufactured, assembled, and marked in accordance with:

(i) Section 173.7(a) and Parts 173, 178, or 179 of this subchapter.

(ii) A specification of the Department in effect at the date of manufacture of the packaging or container;

(iii) National or international regulations based on the UN Recommendations on the Transport of Dangerous Goods, as authorized in §173.24(d)(2);

(iv) An approval issued under this subchapter; or

(v) An exemption issued under subchapter A of this chapter.

(3) In making the determination under paragraph (a)(2) of this section, the person may accept:

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- (i) Except for the marking on the bottom of a metal or plastic drum with a capacity over 100 liters which has been reconditioned, remanufactured or otherwise converted, the manufacturer's certification, specification, approval, or exemption marking (see §§178.2 and 179.1 of this subchapter); or
- (ii) With respect to cargo tanks provided by a carrier, the manufacturer's identification plate or a written certification of specification or exemption provided by the carrier.
- (4) For a DOT specification or UN standard packaging subject to the requirements of part 178 of this subchapter, a person shall perform all functions necessary to bring that package into compliance with part 178 of this subchapter, as identified by the packaging manufacturer or subsequent distributor, in accordance with §178.2 of this subchapter.
- (b) [Reserved]
- (c) Prior to each shipment of fissile radioactive materials, and Type B or highway route controlled quantity packages of radioactive materials (see §173.403), the shipper shall notify the consignee of the dates of shipment and expected arrival. The shipper shall also notify each consignee of any special loading/unloading instructions prior to his first shipment. For any shipment of irradiated reactor fuel, the shipper shall provide physical protection in compliance with a plan established under:
 - (1) Requirements prescribed by the U.S. Nuclear Regulatory Commission, or
 - (2) Equivalent requirements approved by the Associate Administrator for Hazardous Materials Safety, RSPA.
- (d) [Removed]

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 25

Authorized packages and overpacks.

- (a) Authorized packages containing hazardous materials may be offered for transportation in an overpack as defined in § 171.8 of this subchapter, if all of the following conditions are met:
 - (1) The package meets the requirements of §§ 173.21 and 173.24 of this subchapter.
 - (2) The overpack is marked with the proper shipping name and identification number, and labeled as required by this subchapter for each hazardous material contained therein unless markings and labels representative of each hazardous material in the overpack are visible.
 - (3) Each package subject to the orientation marking requirements of § 172.312 of this subchapter

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is packed in the overpack with its filling holes up and the overpack is marked with package orientation marking arrows on two opposite vertical sides of the overpack with the arrows pointing in the correct direction of orientation.

(4) The overpack is marked with a statement indicating that the inside (inner) packages comply with prescribed specifications when specification packagings are required, unless specification markings on the inside packages are visible.

(5) Packages containing Class 8 (corrosive) materials in Packing Group I or Division 5.1 (oxidizing) materials in Packing Group I may not be overpacked with any other materials.

(b) Shrink-wrapped or stretch-wrapped trays may be used as outer packagings for inner packagings prepared in accordance with the limited quantity provisions or consumer commodity provisions of this subchapter, provided that the complete package is capable of meeting performance standards at the Packing Group III performance level. Each package may not exceed 20 kg (44 lbs) gross weight.

(c) Hazardous materials which are required to be labeled POISON may be transported in the same motor vehicle with material that is marked or known to be foodstuffs, feed or any edible material intended for consumption by humans or animals provided the hazardous material is marked, labeled, and packaged in accordance with this subchapter, conforms to the requirements of paragraph (a) of this section and is overpacked as specified in § 177.841(e) of this subchapter or in an overpack which is a UN 1A2, 1B2, or 1N2 drum tested and marked for a Packing Group II or higher performance level.

13.2.1.7.1 Multiple Hazard Classification

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 2a

Classification of a material having more than one hazard.

(a) Classification of a material having more than one hazard. Except as provided in paragraph (c) of this section, a material not specifically listed in the § 172.101 Table that meets the definition of more than one hazard class or division as defined in this part, shall be classed according to the highest applicable hazard class of the following hazard classes, which are listed in descending order of hazard:

- (1) Class 7 (radioactive materials, other than limited quantities).
- (2) Division 2.3 (poisonous gases).
- (3) Division 2.1 (flammable gases).

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(4) Division 2.2 (nonflammable gases).

(5) Division 6.1 (poisonous liquids), Packing Group I, poisonous-by-inhalation only.

(6) A material that meets the definition of a pyrophoric material in § 173.124(b)(1) of this subchapter (Division 4.2).

(7) A material that meets the definition of a self-reactive material in § 173.124(a)(2) of this subchapter (Division 4.1).

(8) Class 3 (flammable liquids), Class 8 (corrosive materials), Division 4.1 (flammable solids), Division 4.2 (spontaneously combustible materials), Division 4.3 (dangerous when wet materials), Division 5.1 (oxidizers) or Division 6.1 (poisonous liquids or solids other than Packing Group I, poisonous-by-inhalation). The hazard class and packing group for a material meeting more than one of these hazards shall be determined using the precedence table in paragraph (b) of this section.

(9) Combustible liquids.

(10) Class 9 (miscellaneous hazardous materials).

(b) Precedence of hazard table for Classes 3 and 8 and Divisions 4.1, 4.2, 4.3, 5.1 and 6.1. The following table ranks those materials that meet the definition of Classes 3 and 8 and Divisions 4.1, 4.2, 4.3, 5.1 and 6.1:

Precedence of Hazard Table

[Hazard class and packing group]

{SEE 49 CFR 173.2a for the HAZARD TABLE}

(c) The following materials are not subject to the provisions of paragraph (a) of this section because of their unique properties:

(1) A Class 1 (explosive) material that meets any other hazard class or division as defined in this part shall be assigned a division in Class 1. Class 1 materials shall be classed and approved in accordance with § 173.56 of this part;

(2) A Division 5.2 (organic peroxide) material that meets the definition of any other hazard class or division as defined in this part, shall be classed as Division 5.2;

(3) A Division 6.2 (infectious substance) material that also meets the definition of another hazard class or division, other than Class 7, or that also is a limited quantity Class 7 material, shall be classed as Division 6.2;

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(4) A material that meets the definition of a wetted explosive in § 173.124(a)(1) of this subchapter (Division 4.1). Wetted explosives are either specifically listed in the § 172.101 Table or are approved by the Associate Administrator for Hazardous Materials Safety (see § 173.124(a)(1) of this subchapter); and

(5) A limited quantity of a Class 7 (radioactive) material that meets the definition for more than one hazard class or division shall be classed in accordance with § 173.423.

13.2.1.7.2 Non-Bulk Packagings

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 211(a)

When §172.101 of this subchapter specifies that a solid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each package must conform to the general packaging requirements of subpart B of part 173, to the requirements of part 178 of this subchapter at the Packing Group I performance level, and to the requirements of the special provisions of Column 7 of the §172.101 Table.

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 212(a)

When §172.101 of this subchapter specifies that a solid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each package must conform to the general packaging requirements of subpart B of part 173, to the requirements of part 178 of this subchapter at the Packing Group I or II performance level, and to the requirements of the special provisions of Column 7 of the §172.101 Table.

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 213(a)

When §172.101 of this subchapter specifies that a solid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each package must conform to the general packaging requirements of subpart B of part 173, to the requirements of part 178 of this subchapter at the Packing Group I, II or III performance level, and to the requirements of the special provisions of Column 7 of the §172.101 Table.

13.2.1.8 Packaging Limitations

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 433

Requirements for determining A1 and A2 values for radionuclides and for the listing of radionuclides on shipping papers and labels.

(a) Values of A1 and A2 for individual radionuclides that are the basis for many activity limits elsewhere in this subchapter are given in the table in §173.435.

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(b) For individual radionuclides whose identities are known, but which are not listed in the table in §173.435, the determination of the values of A1 and A2 requires approval from the Associate Administrator for Hazardous Materials Safety except that the values of A1 and A2 in Table 10 may be used without obtaining approval from Associate Administrator for Hazardous Materials Safety.

(c) In calculating A1 and A2 values for a radionuclide not listed in the table in §173.435, a single radioactive decay chain in which the radionuclides are present in their naturally-occurring proportions, and in which no daughter nuclide has a half life either longer than 10 days or longer than that of the parent nuclide, will be considered as a single radionuclide, and the activity to be taken into account and the A1 or A2 value to be applied will be those corresponding to the parent nuclide of that chain. Otherwise, the parent and daughter nuclides will be considered as a mixture of different nuclides.

(d) Mixtures of radionuclides whose identities and respective activities are known, must conform to the following conditions:

{REFER TO 49CFR173.433(d)(1)&(2) table}

(e) When the identity of each nuclide is known but the individual activities of some of the radionuclides are not known, the radionuclides may be grouped and the lowest A1 or A2 value, as appropriate, for the radionuclides in each group may be used in applying the formulas in paragraph (d) of this section. Groups may be based on the total alpha activity and the total beta/gamma activity when these are known, using the lowest A1 or A2 values for the alpha emitters or beta/gamma emitters, respectively.

(f) Shipping papers and labeling.

(1) For mixtures of radionuclides, the radionuclides (n) that must be shown on shipping papers and labels in accordance with §§172.203 and 172.403 of this subchapter, respectively, must be determined on the basis of the following formula:

{REFER TO 49CFR173.433(f) table}

(g) Table 10 is as follows:

{REFER TO 49CFR173.433(g) table}

13.2.1.8.1 Activity Limitations

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 431

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Activity limits for Type A and Type B packages.

- (a) Except for LSA material and SCO, a Type A package may not contain a quantity of Class 7 (radioactive) materials greater than A1 for special form Class 7 (radioactive) material or A2 for normal form Class 7 (radioactive) material as listed in §173.435, or, for Class 7 (radioactive) materials not listed in §173.435, as determined in accordance with §173.433.
- (b) The limits on activity contained in a Type B, Type B(U), or Type B(M) package are those prescribed in §§173.416 and 173.417, or in the applicable approval certificate under §§173.471, 173.472 or 173.473.

13.2.1.8.2 Radiation Levels

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 441

Radiation level limitations.

- (a) Except as provided in paragraph (b) of this section, each package of Class 7 (radioactive) materials offered for transportation must be designed and prepared for shipment, so that under conditions normally incident to transportation, the radiation level does not exceed 2 mSv/hour (200 mrem/hour) at any point on the external surface of the package, and the transport index does not exceed 10.
- (b) A package which exceeds the radiation level limits specified in paragraph (a) of this section must be transported by exclusive use shipment, and the radiation levels for such shipment may not exceed the following during transportation:
 - (1) 2 mSv/h (200 mrem/h) on the external surface of the package unless the following conditions are met, in which case the limit is 10 mSv/h (1000 mrem/h):
 - (i) The shipment is made in a closed transport vehicle;
 - (ii) The package is secured within the vehicle so that its position remains fixed during transportation; and
 - (iii) There are no loading or unloading operations between the beginning and end of the transportation;
 - (2) 2 mSv/h (200 mrem/h) at any point on the outer surfaces of the vehicle, including the top and underside of the vehicle; or in the case of a flat-bed style vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load or enclosure if used, and on the lower external surface of the vehicle;

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- (3) 0.1 mSv/h (10 mrem/h) at any point 2 meters (6.6 feet) from the outer lateral surfaces of the vehicle (excluding the top and underside of the vehicle); or in the case of a flat-bed style vehicle, at any point 2 meters (6.6 feet) from the vertical planes projected by the outer edges of the vehicle (excluding the top and underside of the vehicle); and
- (4) 0.02 mSv/h (2 mrem/h) in any normally occupied space, except that this provision does not apply to private carriers if exposed personnel under their control wear radiation dosimetry devices as part of a radiation protection program that satisfies the requirements of subpart I of part 172 of this subchapter.
- (c) For shipments made under the provisions of paragraph (b) of this section, the offeror shall provide specific written instructions for maintenance of the exclusive use shipment controls to the carrier. The instructions must be included with the shipping paper information. The instructions must be sufficient so that, when followed, they will cause the carrier to avoid actions that will unnecessarily delay delivery or unnecessarily result in increased radiation levels or radiation exposures to transport workers or members of the general public.
- (d) Packages exceeding the radiation level or transport index prescribed in paragraph (a) of this section may not be transported by aircraft.

13.2.1.8.3 Contamination Levels

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 443

Contamination control.

- (a) The level of non-fixed (removable) radioactive contamination on the external surfaces of each package offered for transport must be kept as low as reasonably achievable. The level of non-fixed radioactive contamination may not exceed the limits set forth in Table 11 and must be determined by either:
- (1) Wiping an area of 300 square centimeters of the surface concerned with an absorbent material, using moderate pressure, and measuring the activity on the wiping material. Sufficient measurements must be taken in the most appropriate locations to yield a representative assessment of the non-fixed contamination levels. The amount of radioactivity measured on any single wiping material, when averaged over the surface wiped, may not exceed the limits set forth in Table 11 at any time during transport; or
- (2) Using other methods of assessment of equal or greater efficiency, in which case the efficiency of the method used must be taken into account and the non-fixed contamination on the external surfaces of the package may not exceed ten times the limits set forth in Table 11, as follows:
- {REFER TO 49CFR173.443(a)(2) table}

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(b) Except as provided in paragraph (d) of this section, in the case of packages transported as exclusive use shipments by rail or public highway only, the removable (non-fixed) radioactive contamination on any package at any time during transport may not exceed ten times the levels prescribed in paragraph (a) of this section. The levels at the beginning of transport may not exceed the levels prescribed in paragraph (a) of this section.

(c) Except as provided in paragraph (d) of this section, each transport vehicle used for transporting Class 7 (radioactive) materials as an exclusive use shipment that utilizes the provisions of paragraph (b) of this section must be surveyed with appropriate radiation detection instruments after each use. A vehicle may not be returned to service until the radiation dose rate at each accessible surface is 0.005 mSv per hour (0.5 mrem per hour) or less, and there is no significant removable (non-fixed) radioactive surface contamination as specified in paragraph (a) of this section.

(d) Paragraphs (b) and (c) of this section do not apply to any closed transport vehicle used solely for the transportation by highway or rail of Class 7 (radioactive) material packages with contamination levels that do not exceed 10 times the levels prescribed in paragraph (a) of this section if--

(1) A survey of the interior surfaces of the empty vehicle shows that the radiation dose rate at any point does not exceed 0.1 mSv per hour (10 mrem per hour) at the surface or 0.02 mSv per hour (2 mrem per hour) at 1 meter (3.3 feet) from the surface;

(2) Each vehicle is stenciled with the words "For Radioactive Materials Use Only" in letters at least 76 millimeters (3 inches) high in a conspicuous place on both sides of the exterior of the vehicle; and

(3) Each vehicle is kept closed except for loading or unloading.

13.2.1.8.4 Thermal Levels

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 442

Thermal limitations.

A package of Class 7 (radioactive) material must be designed, constructed, and loaded so that--

(a) The heat generated within the package by the radioactive contents will not, during conditions normally incident to transport, affect the integrity of the package; and

(b) The temperature of the accessible external surfaces of the loaded package will not, assuming still air in the shade at an ambient temperature of 38 C (100 F), exceed either--

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- (1) 50 C (122 F) in other than an exclusive use shipment; or
- (2) 85 C (185 F) in an exclusive use shipment.

13.2.2 Coordination and Planning of Base Technology

No requirements applicable to the 324 Building were identified within this subelement.

13.2.3 Vehicle and Equipment Control and Maintenance

No requirements pertaining to vehicle and equipment control and maintenance are applicable to the 324 Building, as this is the responsibility of another FDH Contract level organization. The applicable requirements are delineated in the FDH Contract level S/RID.

13.2.4 Onsite Material Tracking

No requirements applicable to the 324 Building were identified under this subelement.

13.2.5 Offsite Transportation Management

The requirements applicable to Offsite Transportation Management are the responsibility of the FDH Contract level TP Organization and are delineated within the FDH Contract level S/RID.

13.2.6 Marking, Labeling and Placarding

13.2.6.1 Marking Requirements

REQUIREMENT SOURCE: 40 CFR 761, Dated 07-01-95, Part 40(b)

As of October 1, 1978, each transport vehicle shall be marked on each end and side with ML as described in §761.45(a) if it is loaded with PCB Containers that contain more than 45 kg (99.4 lbs.) of PCBs in the liquid phase or with one or more PCB Transformers (See also paragraph (e) of this section).

REQUIREMENT SOURCE: 40 CFR 761, Dated 07-01-95, Part 40(e)

As of October 1, 1979, applicable PCB Items in paragraphs (a) (1), (6), (7), and (8) of this section containing PCBs in concentrations of 50 to 500 ppm and applicable transport vehicles in paragraph (b) of this section loaded with PCB Containers that contain more than 45 kg (99.4 lbs.) of liquid PCBs in concentrations of 50 ppm to 500 ppm shall be marked with mark ML as described in

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§761.45(a).

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 300

- (a) Each person who offers a hazardous material for transportation shall mark each package, freight container, and transport vehicle containing the hazardous material in the manner required by this subpart.
- (b) When assigned the function by this subpart, each carrier that transports a hazardous material shall mark each package, freight container, and transport vehicle containing the hazardous material in the manner required by this subpart.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 302

(a) Identification numbers. Except as otherwise provided in this subpart, no person may offer for transportation or transport a hazardous material in a bulk packaging unless the packaging is marked as required by §172.332 with the identification number specified for the material in the §172.101 Table-

- (1) On each side and each end, if the packaging has a capacity of 3,785 L (1,000 gallons) or more;
 - (2) On two opposing sides, if the packaging has a capacity of less than 3,785 L (1,000 gallons); or
 - (3) For cylinders permanently installed on a tube trailer motor vehicle, on each side and each end of the motor vehicle.
- (b) Size of markings. Except as otherwise provided, markings required by this subpart on bulk packagings must have a width of at least 6.0 mm (0.24 inch) and a height of at least-
- (1) 100 mm (3.9 inches) for rail cars;
 - (2) 25 mm (one inch) for portable tanks with capacities of less than 3,785 L (1,000 gallons); and
 - (3) 50 mm (2.0 inches) for cargo tanks and other bulk packages.
- (c) Exemption packagings. The outside of each bulk package used under the terms of an exemption shall be plainly and durably marked "DOT-E" followed by the exemption number assigned.
- (d) Each bulk packaging marked with a proper shipping name, common name or identification number as required by this subpart must remain marked when it is emptied unless it is-

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- (1) Sufficiently cleaned of residue and purged of vapors to remove any potential hazard; or
- (2) Refilled, with a material requiring different markings or no markings, to such an extent that any residue remaining in the packaging is no longer hazardous.
- (e) Additional requirements for marking portable tanks, cargo tanks, tank cars, multi-unit tank car tanks, and other bulk packagings are prescribed in §§172.326, 172.328, 172.330, and 172.331, respectively, of this subpart.
- (f) A bulk packaging marked prior to October 1, 1991, in conformance to the regulations of this subchapter in effect on September 30, 1991, need not be remarked if the key words of the proper shipping name are identical to those currently specified in the §172.101 Table. For example, a tank car marked "ANHYDROUS AMMONIA" need not be remarked "ANHYDROUS AMMONIA, LIQUEFIED".

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 303

- (a) No person may offer for transportation or transport a package which is marked with the proper shipping name or identification number of a hazardous material unless the package contains the identified hazardous material or its residue.
- (b) This section does not apply to-
 - (1) Transportation of a package in a transport vehicle or freight container if the package is not visible during transportation and is loaded by the shipper and unloaded by the shipper or consignee.
 - (2) Markings on a package which are securely covered in transportation.
 - (3) The marking of a shipping name on a package when the name describes a material not regulated under this subchapter.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 312

- (a) Except as provided in this section, each non-bulk combination package having inner packagings containing liquid hazardous materials must be:
 - (1) Packed with closures upward, and
 - (2) Legibly marked, with package orientation markings that conform pictorially to ISO Standard 780-1985, on two opposite vertical sides of the package with the arrows pointing in the correct upright direction. Depicting a rectangular border around the arrows is optional.

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> > See accompanying hardcopy for illustration. Part 172.312, page 750. < <

- (b) Arrows for purposes other than indicating proper package orientation may not be displayed on a package containing a liquid hazardous material.
- (c) The requirements of paragraph (a) of this section do not apply to-
 - (1) A non-bulk package with inner packagings which are cylinders.
 - (2) Except when offered or intended for transportation by aircraft, packages containing flammable liquids in inner packagings of one liter or less prepared in accordance with §173.150 (b) or (c) of this subchapter.
 - (3) When offered or intended for transportation by aircraft, packages containing flammable liquids in inner packagings of 120 ml (4 fluid oz.) or less prepared in accordance with §173.150 (b) or (c) of this subchapter when packed with sufficient absorption material between the inner and outer packagings to completely absorb the liquid contents.
 - (4) Liquids contained in manufactured articles (e.g., alcohol or mercury in thermometers) which are leak-tight in all orientations.
 - (5) A non-bulk package with hermetically-sealed inner packagings.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 332

Identification number markings.

- (a) General. When required by §172.302, §172.326, §172.328, §172.330, or §172.331 of this subpart, identification numbers shall be displayed on orange panels or placards as specified in this section or, when appropriate, on white square-on-point configurations as prescribed in §172.336(b).
- (b) Orange panels. Display of an identification number on an orange panel shall be in conformance with the following:
 - (1) The orange panel must be 160 mm (6.3 inches) high by 400 mm (15.7 inches) wide with a 15 mm (0.6 inches) black outer border. The identification number shall be displayed in 100 mm (3.9 inches) black Helvetica Medium numerals on the orange panel. Measurements may vary from those specified plus or minus 5 mm (0.2 inches).
 - (2) The orange panel may be made of any durable material prescribed for placards in §172.519, and shall be of the orange color specified for labels or placards in appendix A to this part.

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- (3) The name and hazard class of a material may be shown in the upper left border of the orange panel in letters not more than 18 points high.
- (4) Except for size and color, the orange panel and identification numbers shall be as illustrated for Liquefied petroleum gas:
- (c) Placards. Display of an identification number on a hazard warning placard shall be in conformance with the following:
- (1) The identification number shall be displayed across the center area of the placard in 88 mm (3.5 inches) black Alpine Gothic or Alternate Gothic No. 3 numerals on a white background 100 mm (3.9 inches) high and approximately 215 mm (8.5 inches) wide and may be outlined with a solid or dotted line border.
- (2) The top of the 100 mm (3.9 inches) high white background shall be approximately 40 mm (1.6 inches) above the placard horizontal center line.
- (3) An identification number may be displayed only on a placard corresponding to the primary hazard class of the hazardous material.
- (4) For a COMBUSTIBLE placard used to display an identification number, the entire background below the white background for the identification number must be white during transportation by rail and may be white during transportation by highway.
- (5) The name of the hazardous material and the hazard class may be shown in letters not more than 18 points high immediately within the upper border of the space on the placard bearing the identification number of the material.
- (6) If an identification number is placed over the word(s) on a placard, the word(s) should be substantially covered to maximize the effectiveness of the identification number.
- (d) Except for size and color, the display of an identification number on a placard shall be as illustrated for Acetone:

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 334

Identification numbers; prohibited display.

- (a) No person may display an identification number on a RADIOACTIVE, EXPLOSIVES 1.1, 1.2, 1.3, 1.4, 1.5 or 1.6, DANGEROUS, or subsidiary hazard placard.
- (b) No person may display an identification number on a placard, orange panel or white square-on-point display configuration unless-

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- (1) The identification number is specified for the material in §172.101;
- (2) The identification number is displayed on the placard, orange panel or white square-on-point configuration authorized by §172.332 or §172.336(b), as appropriate, and any placard used for display of the identification number corresponds to the hazard class of the material specified in §172.504;
- (3) Except as provided under §172.336 (c)(4) or (c)(5), the package, freight container, or transport vehicle on which the number is displayed contains the hazardous material associated with that identification number in 172.101.
- (c) Except as required by §172.332(c)(4) for a combustible liquid, the identification number of a material may be displayed only on the placards required by the tables in §172.504.
- (d) Except as provided in §172.336, a placard bearing an identification number may not be used to meet the requirements of subpart F of this part unless it is the correct identification number for all hazardous materials of the same class in the transport vehicle or freight container on which it is displayed.
- (e) Except as specified in §172.338, an identification number may not be displayed on an orange panel on a cargo tank unless affixed to the cargo tank by the person offering the hazardous material for transportation in the cargo tank.
- (f) If a placard is required by §172.504, an identification number may not be displayed on an orange panel unless it is displayed in proximity to the placard.
- (g) No person shall add any color, number, letter, symbol, or word other than as specified in this subchapter, to any identification number marking display which is required or authorized by this subchapter.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 336

Author's Note: All of item (c) is nonapplicable to the 324 building.

Identification numbers; special provisions.

- (a) When not required or prohibited by this subpart, identification numbers may be displayed on a transport vehicle or a freight container in the manner prescribed by this subpart.
- (b) For hazardous materials in hazard classes for which hazard warning placards are not specified, identification numbers, when required, must be displayed on either orange panels (see §172.332(b)) or on a plain white square-on-point display configuration having the same outside dimensions as a placard. In addition, for materials in hazard classes for which placards are specified and identification number displays are required, but for which identification numbers

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may not be displayed on the placards authorized for the material (see §172.334(a)), identification numbers must be displayed on orange panels or on the plain white square-on-point display configuration in association with the required placards. An identification number displayed on a white square-on-point display configuration is not considered to be a placard.

(1) The 100 mm (3.9 inch) by 215 mm (8.5 inches) area containing the identification number shall be located as prescribed by §172.332 (c)(1) and (c)(2) and may be outlined with a solid or dotted line border.

(2) [Reserved]

(c) Identification numbers are not required:

(1) On the ends of a portable tank, cargo tank or tank car having more than one compartment if hazardous materials having different identification numbers are being transported therein. In such a circumstance, the identification numbers on the sides of the tank shall be displayed in the same sequence as the compartments containing the materials they identify.

(2) On a cargo tank containing only gasoline, if the cargo tank is marked "Gasoline" on each side and rear in letters no less than 50 mm (2 inches) high, or is placarded in accordance with §172.542(c).

(3) On a cargo tank containing only fuel oil, if the cargo tank is marked "Fuel Oil" on each side and rear in letters no less than 50 mm (2 inches) high, or is placarded in accordance with §172.544(c).

(4) For each of the different liquid petroleum distillate fuels, including gasoline and gasohol in a compartmented cargo tank or tank car, if the identification number is displayed for the distillate fuel having the lowest flash point.

(5) For each of the different liquid petroleum distillate fuels, including gasoline and gasohol transported in a cargo tank, if the identification number is displayed for the liquid petroleum distillate fuel having the lowest flash point.

(6) On nurse tanks meeting the provisions of §173.315(m) of this subchapter.

13.2.6.1.1 Hazardous Materials

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 301

(a) Proper shipping name and identification number.

(1) Except as otherwise provided by this subchapter, each person who offers for transportation a

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hazardous material in a non-bulk packaging shall mark the package with the proper shipping name and identification number (preceded by "UN" or "NA", as appropriate) for the material as shown in the §172.101 table.

(2) The proper shipping name for a hazardous waste (as defined in §171.8 of this subchapter) is not required to include the word "waste" if the package bears the EPA marking prescribed by 40 CFR 262.32.

(b) Technical names. In addition to the marking required by paragraph (a) of this section, each non-bulk packaging containing hazardous materials subject to the provisions of §172.203(k) of this part shall be marked with the technical name in parentheses in association with the proper shipping name in accordance with the requirements and exceptions specified for display of technical descriptions on shipping papers in §172.203(k) of this part.

(c) Exemption packagings. The outside of each package authorized by an exemption shall be plainly and durably marked "DOT-E" followed by the exemption number assigned.

(d) Consignee's or consignor's name and address. Each person who offers for transportation a hazardous material in a non-bulk package shall mark that package with the name and address of the consignor or consignee except when the package is-

(1) Transported by highway only and will not be transferred from one motor carrier to another; or
(2) Part of a carload lot, truckload lot or freight container load, and the entire contents of the rail car, truck or freight container are shipped from one consignor to one consignee.

(e) Previously marked packagings. A package which has been previously marked as required for the material it contains and on which the marking remains legible, need not be remarked. (For empty packagings, see §173.29 of this subchapter.)

(f) Marking exceptions.

(1) Identification numbers are not required on packages which contain only limited quantities, as defined in §171.8 of this subchapter, or ORM-D materials.

(2) The marking of technical names on non-bulk packagings filled for shipment prior to December 31, 1990 is not required until December 31, 1991.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 304

(a) The marking required in this subpart-

(1) Must be durable, in English and printed on or affixed to the surface of a package or on a label, tag, or sign.

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- (2) Must be displayed on a background of sharply contrasting color;
- (3) Must be unobscured by labels or attachments; and
- (4) Must be located away from any other marking (such as advertising) that could substantially reduce its effectiveness.

13.2.6.1.2 Radioactive Materials

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 310

In addition to any other markings required by this subpart, each package containing Class 7 (radioactive) materials must be marked as follows:

- (a) Each package with a gross mass greater than 50 kilograms (110 pounds) must have the its gross mass marked on the outside of the package.
- (b) Each packaging must be marked on the outside of the package, in letters at least 13 mm (0.5 inch) high, with the words "TYPE A" or "TYPE B" as appropriate. A packaging which does not conform to Type A or Type B requirements may not be so marked.
- (c) Each Type B, Type B(U) or Type B(M) packaging must be marked on the outside of the package with a radiation symbol that conforms to the requirements of Appendix B to Part 172.
- (d) Each package destined for export shipment must also be marked "USA" in conjunction with the specification marking, or other package certificate identification. (See §§173.471, 173.472, and 173.473 of this subchapter).

13.2.6.1.3 Hazardous Substances

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 324

For each non-bulk package that contains a hazardous substance-

- (a) Except for radioactive material in packages labeled in accordance with §172.403 of this subchapter, if the proper shipping name does not identify the hazardous substance by name, one of the following descriptions shall be marked on the package, in parentheses, in association with the proper shipping name:
 - (1) The name of the hazardous substance as shown in Appendix A to §172.101; or
 - (2) For waste streams, the waste stream number; or

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(3) For wastes which exhibit an EPA characteristic of ignitability, corrosivity, reactivity, or Toxicity, the letters "EPA" followed by the word "ignitability", or "corrosivity", or "reactivity", or "Toxicity", as appropriate or the corresponding "D" number, as appropriate.

(b) The letters "RQ" shall be marked on the package in association with the proper shipping name.

13.2.6.2 Labeling Requirements

13.2.6.2.1 Hazardous Materials

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 400

General labeling requirements.

(a) Except as specified in §172.400a, each person who offers for transportation or transports a hazardous material in any of the following packages or containment devices, shall label the package or containment device with labels specified for the material in the §172.101 Table and in this subpart:

- (1) A non-bulk package;
- (2) A bulk packaging, other than a cargo tank, portable tank, or tank car, with a volumetric capacity of less than 18 m³ (640 cubic feet), unless placarded in accordance with subpart F of this part;
- (3) A portable tank of less than 3785 L (1000 gallons) capacity, unless placarded in accordance with subpart F of this part;
- (4) A DOT Specification 106 or 110 multi-unit tank car tank, unless placarded in accordance with subpart F of this part; and
- (5) An overpack, freight container or unit load device, of less than 18 m³ (640 cubic feet), which contains a package for which labels are required, unless placarded or marked in accordance with §172.512 of this part.

(b) Labeling is required for a hazardous material which meets one or more hazard class definitions, in accordance with Column 6 of the §172.101 Table and the following table:
{REFER TO 49CFR172.400(b) for Table}

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 400a

Exceptions from labeling.

(a) Notwithstanding the provisions of §172.400, a label is not required on-

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- (1) A cylinder, or a Dewar flask conforming to §173.320 containing a Division 2.1 or Division 2.2 gas that is-
 - (i) Not poisonous;
 - (ii) Carried by a private or contract motor carrier;
 - (iii) Not overpacked; and
 - (iv) Durably and legibly marked in accordance with CGA Pamphlet C-7, appendix A.
- (2) A package or unit of military explosives (including ammunition) shipped by or on behalf of the DOD when in-
 - (i) Freight containerload, carload or truckload shipments, if loaded and unloaded by the shipper or DOD; or
 - (ii) Unitized or palletized break-bulk shipments by cargo vessel under charter to DOD if at least one required label is displayed on each unitized or palletized load.
- (3) A package containing a hazardous material other than ammunition that is-
 - (i) Loaded and unloaded under the supervision of DOD personnel, and
 - (ii) Escorted by DOD personnel in a separate vehicle.
- (4) A compressed gas cylinder permanently mounted in or on a transport vehicle.
- (5) A freight container, aircraft unit load device or portable tank, which-
 - (i) Is placarded in accordance with subpart F of this part, or
 - (ii) Conforms to paragraph (a)(3) or (b)(3) of §172.512.
- (6) An overpack or unit load device in or on which labels representative of each hazardous material in the overpack or unit load device are visible.
- (7) A package of low specific activity radioactive material, when transported under §173.425(b) of this subchapter.
- (b) Certain exceptions to labeling requirements are provided for small quantities and limited quantities in applicable sections in part 173 of this subchapter.

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(c) Notwithstanding the provisions of §172.402(a), a subsidiary hazard label is not required on a package containing a Class 8 (corrosive) material which has a subsidiary hazard of Division 6.1 (poisonous) if the toxicity of the material is based solely on the corrosive destruction of tissue rather than systemic poisoning.

(d) For Division 6.1 Packing Group III materials, a POISON label may be used in place of a KEEP AWAY FROM FOOD label.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 401

Prohibited labeling.

(a) Except as otherwise provided in this section, no person may offer for transportation and no carrier may transport a package bearing a label specified in this subpart unless:

- (1) The package contains a material that is a hazardous material, and
- (2) The label represents a hazard of the hazardous material in the package.

(b) No person may offer for transportation and no carrier may transport a package bearing any marking or label which by its color, design, or shape could be confused with or conflict with a label prescribed by this part.

(c) The restrictions in paragraphs (a) and (b) of this section, do not apply to packages labeled in conformance with:

- (1) Any United Nations recommendation, including the class number (see §172.407), in the document entitled "Transport of Dangerous Goods.";
 - (2) The International Maritime Organization (IMO) requirements, including the class number (see §172.407), in the document entitled "International Maritime Dangerous Goods Code";
 - (3) The ICAO Technical Instructions; or
 - (4) The TDG Regulations.
- (d) The provisions of paragraph (a) of this section do not apply to a packaging bearing a label if that packaging is:
- (1) Unused or cleaned and purged of all residue;
 - (2) Transported in a transport vehicle or freight container in such a manner that the packaging is not visible during transportation; and

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- (3) Loaded by the shipper and unloaded by the shipper or consignee.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 402

Additional labeling requirements.

- (a) Subsidiary hazard labels. Each package containing a hazardous material-

(1) Shall be labeled with primary and subsidiary hazard labels as specified in Column 6 of the §172.101 Table (unless excepted in paragraph (a)(2) of this section); and

(2) For other than Class 1 or Class 2 materials (for subsidiary labeling requirements for Class 1 or Class 2 materials see paragraph (e) or paragraphs (f) and (g), respectively, of this section), if not already labeled under paragraph (a)(1) of this section, shall be labeled with subsidiary hazard labels in accordance with the following table:
{REFER TO 49CFR172.402(2) for Table}

(b) Display of hazard class on labels. The appropriate hazard class or, for Division 5.1 or 5.2 the division number, shall be displayed in the lower corner of a primary hazard label and may not be displayed on a subsidiary label.

(c) Cargo Aircraft Only label. Each person who offers for transportation or transports by aircraft a package containing a hazardous material which is authorized on cargo aircraft only shall label the package with a CARGO AIRCRAFT ONLY label specified in §172.448 of this subpart.

(d) Class 7 (Radioactive) Materials. Except as otherwise provided in this paragraph, each package containing a Class 7 material that also meets the definition of one or more additional hazard classes must be labeled as a Class 7 material as required by §172.403 of this subpart and for each additional hazard. A subsidiary hazard label is not required on a package containing a Class 7 material that conforms to criteria specified in §173.4 of this subchapter, except §173.4(a)(1)(iv) of this subchapter.

(e) Class 1 (explosive) Materials. In addition to the label specified in Column 6 of the §172.101 Table, each package of Class 1 material that also meets the definition for:

(1) Division 6.1, Packing Groups I or II, shall be labeled POISON; or

(2) Class 7, shall be labeled in accordance with §172.403 of this subpart.

(f) Division 2.2 materials. In addition to the label specified in Column 6 of the §172.101 Table, each package of Division 2.2 material that also meets the definition for an oxidizing gas (see §171.8 of this subchapter) must be labeled OXIDIZER.

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(g) Division 2.3 materials. In addition to the label specified in Column 6 of the §172.101 Table, each package of Division 2.3 material that also meets the definition for:

- (1) Division 2.1, must be labeled Flammable Gas;
- (2) Division 5.1, must be labeled Oxidizer; and
- (3) Class 8, must be labeled Corrosive.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 403

Class 7 (radioactive) material.

(a) Unless excepted from labeling by §173.421 through §173.428 of this subchapter, each package of radioactive material must be labeled as provided in this section.

(b) The proper label to affix to a package of Class 7 (radioactive) material is based on the radiation level at the surface of the package and the transport index. The proper category of label must be determined in accordance with paragraph (c) of this section. The label to be applied must be the highest category required for any of the two determining conditions for the package. RADIOACTIVE WHITE-I is the lowest category and RADIOACTIVE YELLOW-III is the highest. For example, a package with a transport index of 0.8 and a maximum surface radiation level of 0.6 millisievert (60 millirems) per hour must bear a RADIOACTIVE YELLOW-III label.

(c) Category of label to be applied to Class 7 (radioactive) materials packages:

(d) **EMPTY** label. See §173.428(d) of this subchapter for **EMPTY** labeling requirements.

(e) [Reserved]

(f) Each package required by this section to be labeled with a **RADIOACTIVE** label must have two of these labels, affixed to opposite sides of the package. (See §172.406(e)(3) for freight container label requirements).

(g) The following applicable items of information must be entered in the blank spaces on the **RADIOACTIVE** label by legible printing (manual or mechanical), using a durable weather resistant means of marking:

(1) **Contents**. The name of the radionuclides as taken from the listing of radionuclides in §173.435 of this subchapter (symbols which conform to established radiation protection terminology are authorized, i.e., .99Mo, .60Co, etc.). For mixtures of radionuclides, with consideration of space available on the label, the radionuclides that must be shown must be determined in accordance with §173.433(f) of this subchapter.

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(2) Activity. Activity units must be expressed in appropriate SI units (e.g., Becquerels (Bq), Terabecquerels (TBq), etc.) or in both appropriate SI units and appropriate customary units (Curies (Ci), milliCuries (mCi), microcuries (uCi), etc.). Alternatively, for domestic transport, the activity may be expressed solely in terms of curies until April 1, 1997. Abbreviations are authorized. Except for plutonium-238, plutonium-239, and plutonium-241, the weight in grams or kilograms of fissile radionuclides may be inserted instead of activity units. For plutonium-238, plutonium-239, and plutonium-241, the weight in grams or kilograms of fissile radionuclides may be inserted in addition to the activity units.

(3) Transport index. (See §173.403 of this subchapter.)

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 404

Labels for mixed and consolidated packaging.

(a) Mixed packaging. When hazardous materials having different hazard classes are packed within the same packaging, or within the same outside container or overpack as described in §173.25 and authorized by §173.21 of this subchapter, the packaging, outside container or overpack must be labeled as required for each class of hazardous material contained therein.

(b) Consolidated packaging. When two or more packages containing compatible hazardous material (see §173.21 of this subchapter) are placed within the same outside container or overpack, the outside container or overpack must be labeled as required for each class of hazardous material contained therein.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 405

Authorized label modifications.

(a) For Classes 1, 2, 3, 4, 5, 6, and 8, text indicating a hazard (for example FLAMMABLE LIQUID) is not required on a primary or subsidiary label when-

(1) The label otherwise conforms to the provisions of this subpart, and

(2) The hazard class or, for Division 5.1 or 5.2 the division number, is displayed in the lower corner of the label, if the label corresponds to the primary hazard class of the hazardous material.

(b) For a package containing Oxygen, compressed, or Oxygen, refrigerated liquid, the OXIDIZER label specified in §172.426 of this subpart, modified to display the word "OXYGEN" instead of "OXIDIZER", and the class number "2" instead of "5.1", may be used in place of the NON-FLAMMABLE GAS and OXIDIZER labels. Notwithstanding the provisions of paragraph (a) of this section, the word "OXYGEN" must appear on the label.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 406

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Placement of labels.

(a) General.

(1) Except as provided in paragraphs (b) and (e) of this section, each label required by this subpart must-

(i) Be printed on or affixed to a surface (other than the bottom) of the package or containment device containing the hazardous material; and

(ii) Be located on the same surface of the package and near the proper shipping name marking, if the package dimensions are adequate.

(2) Except as provided in paragraph (e) of this section, duplicate labeling is not required on a package or containment device (such as to satisfy redundant labeling requirements).

(b) Exceptions. A label may be printed on or placed on a securely affixed tag, or may be affixed by other suitable means to:

(1) A package that contains no radioactive material and which has dimensions less than those of the required label;

(2) A cylinder; and

(3) A package which has such an irregular surface that a label cannot be satisfactorily affixed.

(c) Placement of multiple labels. When primary and subsidiary hazard labels are required, they must be displayed next to each other. Placement conforms to this requirement if labels are within 150 mm (6 inches) of one another.

(d) Contrast with background. Each label must be printed on or affixed to a background of contrasting color, or must have a dotted or solid line outer border.

(e) Duplicate labeling. Generally, only one of each different required label must be displayed on a package. However, duplicate labels must be displayed on at least two sides or two ends (other than the bottom) of-

(1) Each package or overpack having a volume of 1.8 m.3 (64 cubic feet) or more;

(2) Each non-bulk package containing a radioactive material;

(3) Each DOT 106 or 110 multi-unit tank car tank. Labels must be displayed on each end;

(4) Each portable tank of less than 3, 785 L (1000 gallons) capacity; and

(5) Each freight container or aircraft unit load device having a volume of 1.8 m.3 (64 cubic feet) or more, but less than 18 m.3 (640 cubic feet). One of each required label must be displayed on or near the closure.

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(f) Visibility. A label must be clearly visible and may not be obscured by markings or attachments.

13.2.6.3 Placarding Requirements

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 500

Applicability of placarding requirements.

(a) Each person who offers for transportation or transports any hazardous material subject to this subchapter shall comply with the applicable placarding requirements of this subpart.

(b) This subpart does not apply to-

(1) Infectious substances;

(2) Hazardous materials classed as ORM-D;

(3) Hazardous materials authorized by this subchapter to be offered for transportation as Limited Quantities when identified as such on shipping papers in accordance with § 172.203(b);

(4) Hazardous materials which are packaged as small quantities under the provisions of § 173.4 of this subchapter; and

(5) Combustible liquids in non-bulk packagings.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 502

Prohibited and permissive placarding.

(a) Prohibited placarding. Except as provided in paragraph

(b) of this section, no person may affix or display on a packaging, freight container, unit load device, motor vehicle or rail car-

(1) Any placard described in this subpart unless-

(i) The material being offered or transported is a hazardous material;

(ii) The placard represents a hazard of the hazardous material being offered or transported; and

(iii) Any placarding conforms to the requirements of this subpart.

(2) Any sign or other device that, by its color, design, shape or content, could be confused with any placard prescribed in this subpart.

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(b) Exceptions.

- (1) The restrictions in paragraph (a) of this section do not apply to a bulk packaging, freight container, unit load device, transport vehicle or rail car which is placarded in conformance with the TDG Regulations, the IMDG Code or the UN Recommendations.
- (2) The restrictions of paragraph (a) of this section do not apply to the display of an identification number on a white square-on-point configuration in accordance with §172.336(b) of this part.
- (c) Permissive placarding. Placards may be displayed for a hazardous material, even when not required, if the placarding otherwise conforms to the requirements of this subpart.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 504

General placarding requirements.

(a) General. Except as otherwise provided in this subchapter, each bulk packaging, freight container, unit load device, transport vehicle or rail car containing any quantity of a hazardous material must be placarded on each side and each end with the type of placards specified in Tables 1 and 2 of this section and in accordance with other placarding requirements of this subpart, including the specifications for the placards named in the tables and described in detail in §172.519 through 172.560.

(b) DANGEROUS placard. A freight container, unit load device, transport vehicle or rail car which contains non-bulk packagings with two or more categories of hazardous materials that require different placards specified in Table 2 may be placarded with DANGEROUS placards instead of the separate placarding specified for each of the materials in Table 2. However, when 2, 268 kg (5, 000 pounds) or more of one category of material is loaded therein at one loading facility, the placard specified in Table 2 of paragraph (e) of this section for that category must be applied.

(c) Exception for less than 454 kg (1, 001 pounds). Except for bulk packagings and hazardous materials subject to §172.505, when hazardous materials covered by Table 2 of this section are transported by highway or rail, placards are not required on-

(1) A transport vehicle or freight container which contains less than 454 kg (1001 pounds) aggregate gross weight of hazardous materials covered by Table 2 of paragraph (e) of this section; or

(2) A rail car loaded with transport vehicles or freight containers, none of which is required to be placarded. The exceptions provided in paragraph (c) of this section do not prohibit the display of placards in the manner prescribed in this subpart, if not otherwise prohibited (see §172.502), on transport vehicles or freight containers which are not required to be placarded.

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- (d) Exception for empty non-bulk packages. A non-bulk packaging that contains only the residue of a hazardous material covered by Table 2 of paragraph (e) of this section need not be included in determining placarding requirements.
- (e) Placarding tables. Placards are specified for hazardous materials in accordance with the following tables: {REFER TO 49CFR172.504(e) for Table}
- (f) Additional placarding exceptions.
- (1) When more than one division placard is required for Class 1 materials on a transport vehicle, rail car, freight container or unit load device, only the placard representing the lowest division number must be displayed.
- (2) A FLAMMABLE placard may be used in place of a COMBUSTIBLE placard on-
- (i) A cargo tank or portable tank.
- (ii) A compartmented tank car which contains both flammable and combustible liquids.
- (3) A NON-FLAMMABLE GAS placard is not required on a transport vehicle which contains non-flammable gas if the transport vehicle also contains flammable gas or oxygen and it is placarded with FLAMMABLE GAS or OXYGEN placards, as required.
- (4) OXIDIZER placards are not required for Division 5.1 materials on freight containers, unit load devices, transport vehicles or rail cars which also contain Division 1.1 or 1.2 materials and which are placarded with EXPLOSIVES 1.1 or 1.2 placards, as required.
- (5) For transportation by transport vehicle or rail car only, an OXIDIZER placard is not required for Division 5.1 materials on a transport vehicle, rail car or freight container which also contains Division 1.5 explosives and is placarded with EXPLOSIVES 1.5 placards, as required.
- (6) The EXPLOSIVE 1.4 placard is not required for those Division 1.4 Compatibility Group S (1.4S) materials that are not required to be labeled 1.4S.
- (7) For domestic transportation of oxygen, compressed or oxygen, refrigerated liquid, the OXYGEN placard in §172.530 of this subpart may be used in place of a NON-FLAMMABLE GAS placard.
- (8) Except for a material classed as a combustible liquid that also meets the definition of a Class 9 material, a COMBUSTIBLE placard is not required for a material classed as a combustible liquid when transported in a non-bulk packaging. For a material in a non-bulk packaging classed as a combustible liquid that also meets the definition of a Class 9 material, the CLASS 9 placard may be substituted for the COMBUSTIBLE placard.

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(9) For domestic transportation, a Class 9 placard is not required. A bulk packaging containing a Class 9 material must be marked with the appropriate identification number displayed on a Class 9 placard, an orange panel or a white-square-on-point display configuration as required by subpart D of this part.

(10) For domestic transportation of Division 6.1, PG III materials, a POISON placard may be used in place of a KEEP AWAY FROM FOOD placard.

(g) For shipments of Class 1 (explosive) materials by aircraft or vessel, the applicable compatibility group letter must be displayed on the placards required by this section.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 505

Placarding for subsidiary hazards.

(a) Each transport vehicle, freight container, portable tank or unit load device that contains a poisonous material subject to the "Poison-Inhalation Hazard" shipping description of §172.203(m)(3) must be placarded with a POISON or POISON GAS placard, as appropriate, on each side and each end, in addition to any other placard required for that material in §172.504. Duplication of the POISON or POISON GAS placard is not required.

(b) In addition to the RADIOACTIVE placard which may be required by §172.504(e) of this subpart, each transport vehicle, portable tank or freight container that contains 454 kg (1001 pounds) or more gross weight of fissile or low specific activity uranium hexafluoride shall be placarded with a CORROSIVE placard on each side and each end.

(c) Each transport vehicle, portable tank, freight container or unit load device that contains a material which has a subsidiary hazard of being dangerous when wet, as defined in §173.124 of this subchapter, shall be placarded with DANGEROUS WHEN WET placards, on each side and each end, in addition to the placards required by §172.504.

(d) Hazardous materials that possess secondary hazards may exhibit subsidiary placards that correspond to the placards described in this part, even when not required by this part (see also §172.519(b) (4) of this subpart).

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 506

Providing and affixing placards: Highway.

(a) Each person offering a motor carrier a hazardous material for transportation by highway shall provide to the motor carrier the required placards for the material being offered prior to or at the same time the material is offered for transportation, unless the carrier's motor vehicle is already placarded for the material as required by this subpart.

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(1) No motor carrier may transport a hazardous material in a motor vehicle, unless the placards required for the hazardous material are affixed thereto as required by this subpart.

(2) [Reserved]

(b) [Reserved]

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 507

Special placarding provisions: Highway.

(a) Each motor vehicle used to transport a package of highway route controlled quantity Class 7 (radioactive) materials (see §173.403 of this subchapter) must have the required RADIOACTIVE warning placard placed on a square background as described in §172.527.

(b) A nurse tank, meeting the provisions of §173.315(m) of this subchapter, is not required to be placarded on an end containing valves, fittings, regulators or gauges when those appurtenances prevent the markings and placard from being properly placed and visible.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 516

Visibility and display of placards.

(a) Each placard on a motor vehicle and each placard on a rail car must be readily visible from the direction it faces except from the direction of another motor vehicle or rail car to which the motor vehicle or rail car is coupled. This requirement may be met by the placards displayed on the freight containers or portable tanks loaded on a motor vehicle or rail car.

(b) The required placarding of the front of a motor vehicle may be on the front of a truck-tractor instead of or in addition to the placarding on the front of the cargo body to which a truck-tractor is attached.

(c) Each placard on a transport vehicle, bulk packaging, freight container or aircraft unit load device must-

(1) Be securely attached or affixed thereto or placed in a holder thereon. (See appendix C to this part.);

(2) Be located clear of appurtenances and devices such as ladders, pipes, doors, and tarpaulins;

(3) So far as practicable, be located so that dirt or water is not directed to it from the wheels of the transport vehicle;

(4) Be located away from any marking (such as advertising) that could substantially reduce its effectiveness, and in any case at least 3 inches (76.0 mm.) away from such marking;

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- (5) Have the words or identification number (when authorized) printed on it displayed horizontally, reading from left to right.
- (6) Be maintained by the carrier in a condition so that the format, legibility, color, and visibility of the placard will not be substantially reduced due to damage, deterioration, or obscurement by dirt or other matter.
- (7) Be affixed to a background of contrasting color, or must have a dotted or solid line outer border which contrasts with the background color.
- (d) Recommended specifications for a placard holder are set forth in appendix C of this part. Except for a placard holder similar to that contained in appendix C to this part, the means used to attach a placard may not obscure any part of its surface other than the borders.
- (e) A placard or placard holder may be hinged provided the required format, color, and legibility of the placard are maintained.

13.2.7 Shipping Papers, Bills of Lading and Manifests

13.2.7.1 Waste Manifests

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 205

- (a) No person may offer, transport, transfer, or deliver a hazardous waste (waste) unless an EPA Form 8700-22 and 8700-22A (when necessary) hazardous waste manifest (manifest) is prepared in accordance with 40 CFR 262.20 and is signed, carried, and given as required of that person by this section.
- (b) The shipper (generator) shall prepare the manifest in accordance with 40 CFR part 262.
- (c) The original copy of the manifest must be dated by, and bear the handwritten signature of, the person representing:
 - (1) The shipper (generator) of the waste at the time it is offered for transportation, and
 - (2) The initial carrier accepting the waste for transportation.
- (d) A copy of the manifest must be dated by, and bear the handwritten signature of the person representing:
 - (1) Each subsequent carrier accepting the waste for transportation, at the time of acceptance, and
 - (2) The designated facility receiving the waste, upon receipt.

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- (e) A copy of the manifest bearing all required dates and signatures must be:
- (1) Given to a person representing each carrier accepting the waste for transportation,
 - (2) Carried during transportation in the same manner as required by this subchapter for shipping papers,
 - (3) Given to a person representing the designated facility receiving the waste,
 - (4) Returned to the shipper (generator) by the carrier that transported the waste from the United States to a foreign destination with a notation of the date of departure from the United States, and
 - (5) Retained by the shipper (generator) and by the initial and each subsequent carrier for three years from the date the waste was accepted by the initial carrier. Each retained copy must bear all required signatures and dates up to and including those entered by the next person who received the waste.
- (f) The requirements of paragraphs (d) and (e) of this section do not apply to a rail carrier when waste is delivered to a designated facility by railroad if:
- (1) All of the information required to be entered on the manifest (except generator and carrier identification numbers and the generator's certification) is entered on the shipping paper carried in accordance with §174.26(c) of this subchapter;
 - (2) The delivering rail carrier obtains and retains a receipt for the waste that is dated by and bears the handwritten signature of the person representing the designated facility; and
 - (3) A copy of the shipping paper is retained for three years by each railroad transporting the waste.
- (g) The person delivering a hazardous waste to an initial rail carrier shall send a copy of the manifest, dated and signed by a representative of the rail carrier, to the person representing the designated facility.
- (h) A hazardous waste manifest required by 40 CFR part 262, containing all of the information required by this subpart, may be used as the shipping paper required by this subpart.

13.2.7.2 Shipping Papers

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 200

- (a) Description of hazardous materials required. Except as otherwise provided in this subpart,

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each person who offers a hazardous material for transportation shall describe the hazardous material on the shipping paper in the manner required by this subpart.

(b) This subpart does not apply to any material, other than a hazardous substance, hazardous waste, or marine pollutant, that is-

- (1) Identified by the letter "A" in Column 1 of the 172.101 Table, except when the material is offered or intended for transportation by air; or
- (2) Identified by the letter "W" in Column 1 of the 172.101 Table, except when the material is offered or intended for transportation by water; or
- (3) An ORM-D, except when the material is offered or intended for transportation by air.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 201

(a) Contents. When a description of hazardous material is required to be included on a shipping paper, that description must conform to the following requirements:

- (1) When a hazardous material and a material not subject to the requirements of this subchapter are described on the same shipping paper, the hazardous material description entries required by §172.202 and those additional entries that may be required by §172.203:
 - (i) Must be entered first, or
 - (ii) Must be entered in a color that clearly contrasts with any description on the shipping paper of a material not subject to the requirements of this subchapter, except that a description on a reproduction of a shipping paper may be highlighted, rather than printed, in a contrasting color (the provisions of this paragraph apply only to the basic description required by §172.202(a) (1) and (2), and (3)), or
 - (iii) Must be identified by the entry of an "X" placed before the proper shipping name in a column captioned "HM." (The "X" may be replaced by "RQ," if appropriate.)
- (2) The required shipping description on a shipping paper and all copies thereof used for transportation purposes, must be legible and printed (manually or mechanically) in English.
- (3) Unless it is specifically authorized or required in this subchapter, the required shipping description may not contain any code or abbreviation.
- (4) A shipping paper may contain additional information concerning the material provided the information is not inconsistent with the required description. Unless otherwise permitted or required by this subpart, additional information must be placed after the basic description required

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by §172.202(a).

(b) Name of shipper. A shipping paper for a shipment by water must contain the name of the shipper.

(c) Continuation page. A shipping paper may consist of more than one page, if each page is consecutively numbered and the first page bears a notation specifying the total number of pages included in the shipping paper. For example, "Page 1 of 4 pages."

(d) Emergency response telephone number. A shipping paper must contain an emergency response telephone number, as prescribed in subpart G of part 172 of this subchapter.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 202

(a) The shipping description of a hazardous material on the shipping paper must include:

(1) The proper shipping name prescribed for the material in Column 2 of the §172.101 Table;

(2) The hazard class or division prescribed for the material as shown in Column 3 of the §172.101 Table (class names or subsidiary hazard class or division number may be entered following the numerical hazard class, or following the basic description). The hazard class need not be included for the entry "Combustible liquid, n.o.s.'";

(3) The identification number prescribed for the material as shown in Column 4 of the §172.101 Table;

(4) The packing group, in Roman numerals, prescribed for the material in Column 5 of the §172.101 Table, if any. The packing group may be preceded by the letters "PG" (e.g., "PG II"); and

(5) Except for empty packagings (see §173.29 of this subchapter), cylinders for Class 2 (compressed gases) materials, and bulk packagings, the total quantity (by net or gross mass, capacity, or as otherwise appropriate), including the unit of measurement, of the hazardous material covered by the description (e.g., "800 lbs", "55 gal.", "3629 kg", or "208 L"). For cylinders for Class 2 (compressed gases) materials and bulk packagings, some indication of total quantity must be shown (e.g., "10 cylinders" or "1 cargo tank").

(b) Except as provided in this subpart, the basic description specified in paragraphs (a) (1), (2), (3) and (4) of this section must be shown in sequence with no additional information interspersed. For example: "Gasoline, 3, UN 1203, PG II".

(c) The total quantity of the material covered by one description must appear before or after, or both before and after, the description required and authorized by this subpart. The type of

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packaging and destination marks may be entered in any appropriate manner before or after the basic description. Abbreviations may be used to express units of measurement and types of packagings.

(d) Technical and chemical group names may be entered in parentheses between the proper shipping name and hazard class or following the basic description. An appropriate modifier, such as "contains" or "containing," and/or the percentage of the technical constituent may also be used. For example: "Flammable liquids, n.o.s. (contains Xylene and Benzene), 3, UN 1993, II".

(e) Except for those materials in the UN Recommendations, the ICAO Technical Instructions, or the IMDG Code, a material that is not a hazardous material according to this subchapter may not be offered for transportation or transported when its description on a shipping paper includes a hazard class or an identification number specified in §172.101.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 203(b)

(b) Limited quantities. The description for a material offered for transportation as "limited quantity," as authorized by this subchapter, must include the words "Limited Quantity" or "Ltd Qty" following the basic description.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 203(c)

(c) Hazardous substances.

(1) Except for radioactive materials described in accordance with paragraph (d) of this section, if the proper shipping name for a material that is a hazardous substance does not identify the hazardous substance by name, one of the following descriptions shall be entered, in parentheses, in association with the basic description:

(i) The name of the hazardous substance as shown in Appendix A to §172.101; or

(ii) For waste streams, the waste stream number; or

(iii) For wastes which exhibit an EPA characteristic of ignitability, corrosivity, reactivity, or Toxicity, the letters "EPA" followed by the word "ignitability", or "corrosivity", or "reactivity", or "Toxicity", as appropriate or the corresponding "D" number, as appropriate.

(2) The letters "RQ" shall be entered on the shipping paper either before or after, the basic description required by §172.202 for each hazardous substance (see definition in §171.8 of this subchapter). For example: "RQ, Allyl alcohol, 6.1, UN 1098, I"; or "Environmentally hazardous substance, solid, n.o.s., 9, UN 3077, III, RQ (Adipic acid)".

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 203(d)

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(d) Radioactive material. The description for a shipment of a Class 7 (radioactive) material must include the following additional entries as appropriate:

(1) The words "RADIOACTIVE MATERIAL" unless these words are contained in the proper shipping name.

(2) The name of each radionuclide in the Class 7 (radioactive) material that is listed in §173.435 of this subchapter. For mixtures of radionuclides, the radionuclides that must be shown must be determined in accordance with §173.433(f) of this subchapter. Abbreviations, e.g., ".99 Mo", are authorized.

(3) A description of the physical and chemical form of the material, if the material is not in special form (generic chemical description is acceptable for chemical form).

(4) The activity contained in each package of the shipment in terms of the appropriate SI units (e.g. Becquerel, Terabecquerel, etc.) or in terms of the appropriate SI units followed by the customary units (e.g. Curies, millicuries, etc.). Alternatively, for domestic transportation, the activity in a package of Class 7 (radioactive) materials may be described solely in terms of curies until April 1, 1997. Abbreviations are authorized. Except for plutonium-238, plutonium-239, and plutonium-241, the weight in grams or kilograms of fissile radionuclides may be inserted instead of activity units. For plutonium-238, plutonium-239, and plutonium-241 the weight in grams or kilograms of fissile radionuclides may be inserted in addition to the activity units. For the shipment of a package containing a highway route controlled quantity of Class 7 (radioactive) materials (see §173.403 of this subchapter) the words "Highway route controlled quantity" must be entered in association with the basic description.

(5) The category of label applied to each package in the shipment. For example: "RADIOACTIVE WHITE-I."

(6) The transport index assigned to each package in the shipment bearing RADIOACTIVE YELLOW-II or RADIOACTIVE YELLOW-III labels.

(7) For a shipment of fissile Class 7 (radioactive) materials:

(i) The words "Fissile Excepted" if the package is excepted pursuant to §173.453 of this subchapter;

(ii) For a fissile material, controlled shipment, the additional notation: "Warning-Fissile material, controlled shipment. Do not load more than * * * packages per vehicle." (Asterisks to be replaced by appropriate number.) "In loading and storage areas, keep at least 6 meters (20 feet) from other packages bearing radioactive labels"; and

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(iii) If a fissile material, controlled shipment is to be transported by water, the supplementary notation must also include the following statement: "For shipment by water, only one fissile material, controlled shipment is permitted in each hold."

(8) For a package approved by the U.S. Department of Energy (DOE) or U.S. Nuclear Regulatory Commission (USNRC), a notation of the package identification marking as prescribed in the applicable DOE or USNRC approval. (See §173.471 of the subchapter.)

(9) For an export shipment or a shipment in a foreign made package, a notation of the package identification marking as prescribed in the applicable International Atomic Energy Agency (IAEA) Certificate of Competent Authority which has been issued for the package. (See §173.473 of the subchapter.)

(10) For a shipment required by this subchapter to be consigned as exclusive use:

(i) An indication that the shipment is consigned as exclusive use; or

(ii) If all the descriptions on the shipping paper are consigned as exclusive use, then the statement "Exclusive Use Shipment" may be entered only once on the shipping paper in a clearly visible location.

(11) For a shipment of low specific activity material or surface contaminated objects, the appropriate group notation of LSA-I, LSA-II, LSA-III, SCO-I, or SCO-II.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 203(e)

(e) Empty packagings.

(1) The description on the shipping paper for a packaging containing the residue of a hazardous material may include the words "RESIDUE: Last Contained * * *" in association with the basic description of the hazardous material last contained in the packaging.

(2) For a tank car containing the residue (as defined in §171.8) of a hazardous material, the requirements of §174.25(c) and paragraph (e)(3) of this section apply.

(3) If a packaging, including a tank car, contains a residue that is a hazardous substance, the description on the shipping papers must be prefaced with the phrase "RESIDUE: Last Contained ***" and the letters "RQ" must be entered on the shipping paper either before or after the basic description.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 204

(a) General. Except as provided in paragraphs (b) and (c) of this section, each person who offers

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a hazardous material for transportation shall certify that the material is offered for transportation in accordance with this subchapter by printing (manually or mechanically) on the shipping paper containing the required shipping description the certification contained in paragraph (a)(1) of this section or the certification (declaration) containing the language contained in paragraph (a)(2) of this section.

(1) "This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation."

Note: In line one of the certification the words "herein-named" may be substituted for the words "above-named".

(2) "I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations."

(b) Exceptions.

(1) Except for a hazardous waste, no certification is required for a hazardous materials offered for transportation by motor vehicle and transported:

(i) In a cargo tank supplied by the carrier, or

(ii) By the shipper as a private carrier except for a hazardous material that is to be reshipped or transferred from one carrier to another.

(2) No certification is required for the return of an empty tank car which previously contained a hazardous material and which has not been cleaned or purged.

(c) Transportation by air

(1) General. Certification containing the following language may be used in place of the certification required by paragraph (a) of this section:

I hereby certify that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and in proper condition for carriage by air according to applicable national governmental regulations.

(2) Certificate in duplicate. Each person who offers a hazardous material to an aircraft operator for transportation by air shall provide two copies of the certification required in this section. (See §175.30 of this subchapter.)

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(3) Passenger and cargo aircraft. Each person who offers for transportation by air a hazardous material authorized for air transportation shall add to the certification required in this section the following statement:

This shipment is within the limitations prescribed for passenger aircraft/cargo aircraft only (delete nonapplicable).

(4) Radioactive material. Each person who offers any radioactive material for transportation aboard a passenger-carrying aircraft shall sign (mechanically or manually) a printed certificate stating that the shipment contains radioactive material intended for use in, or incident to, research, or medical diagnosis or treatment.

(d) Signature. The certifications required by paragraph (a) or (c) of this section:

(1) Must be legibly signed by a principal, officer, partner, or employee of the shipper or his agent; and

(2) May be legibly signed manually, by typewriter, or by other mechanical means.

13.2.8 Shipment Plans

The requirements identified under this subelement are the responsibility of the FDH Contract level TP Organization and are contained in the FDH Contract level S/RID.

13.2.9 Notification of State Authorities of Shipments of High-Hazard Materials

The requirements identified under this subelement are the responsibility of the FDH Contract level TP Organization and are contained in the FDH Contract level S/RID.

13.2.10 Emergency Response Information

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 600

Applicability and general requirements.

(a) Scope. Except as provided in paragraph (d) of this section, this subpart prescribes requirements for providing and maintaining emergency response information during transportation and at facilities where hazardous materials are loaded for transportation, stored incidental to transportation or otherwise handled during any phase of transportation.

(b) Applicability. This subpart applies to persons who offer for transportation, accept for transportation, transfer or otherwise handle hazardous materials during transportation.

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- (c) General requirements. No person to whom this subpart applies may offer for transportation, accept for transportation, transfer, store or otherwise handle during transportation a hazardous material unless:
- (1) Emergency response information conforming to this subpart is immediately available for use at all times the hazardous material is present; and
 - (2) Emergency response information, including the emergency response telephone number, required by this subpart is immediately available to any person who, as a representative of a Federal, State or local government agency, responds to an incident involving a hazardous material, or is conducting an investigation which involves a hazardous material.
 - (d) Exception. The requirements of this subpart do not apply to hazardous material which is excepted from the shipping paper requirements of this subchapter.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 602

Emergency response information.

- (a) Information required. For purposes of this subpart, the term "emergency response information" means information that can be used in the mitigation of an incident involving hazardous materials and, as a minimum, must contain the following information:
- (1) The basic description and technical name of the hazardous material as required by §172.202 and §172.203(k), the ICAO Technical Instructions, the IMDG Code, or the TDG Regulations, as appropriate;
 - (2) Immediate hazards to health;
 - (3) Risks of fire or explosion;
 - (4) Immediate precautions to be taken in the event of an accident or incident;
 - (5) Immediate methods for handling fires;
 - (6) Initial methods for handling spills or leaks in the absence of fire; and
 - (7) Preliminary first aid measures.
- (b) Form of information. The information required for a hazardous material by paragraph (a) of this section must be:
- (1) Printed legibly in English;

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- (2) Available for use away from the package containing the hazardous material; and
- (3) Presented-
 - (i) On a shipping paper;
 - (ii) In a document, other than a shipping paper, that includes both the basic description and technical name of the hazardous material as required by §172.202 and §172.203(k), the ICAO Technical Instructions, the IMDG Code, or the TDG Regulations, as appropriate, and the emergency response information required by this subpart (e.g., a material safety data sheet); or
 - (iii) Related to the information on a shipping paper, a written notification to pilot-in-command, or a dangerous cargo manifest, in a separate document (e.g., an emergency response guidance document), in a manner that cross-references the description of the hazardous material on the shipping paper with the emergency response information contained in the document. Aboard aircraft, the ICAO "Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods" and, aboard vessels, the IMO "Emergency Procedures for Ships Carrying Dangerous Goods", or equivalent documents, may be used to satisfy the requirements of this section for a separate document.
- (c) Maintenance of information. Emergency response information shall be maintained as follows:
 - (1) Carriers. Each carrier who transports a hazardous material shall maintain the information specified in paragraph (a) of this section in the same manner as prescribed for shipping papers, except that the information must be maintained in the same manner aboard aircraft as the notification to pilot-in-command, and aboard vessels in the same manner as the dangerous cargo manifest. This information must be immediately accessible to train crew personnel, drivers of motor vehicles, flight crew members, and bridge personnel on vessels for use in the event of incidents involving hazardous materials.
 - (2) Facility operators. Each operator of a facility where a hazardous material is received, stored or handled during transportation, shall maintain the information required by paragraph (a) of this section whenever the hazardous material is present. This information must be in a location that is immediately accessible to facility personnel in the event of an incident involving the hazardous material.

REQUIREMENT SOURCE: 49 CFR 172, Dated 10-01-95, Part 604

Emergency response telephone number.

- (a) A person who offers a hazardous material for transportation must provide a 24-hour emergency response telephone number (including the area code or international access code) for use in the event of an emergency involving the hazardous material. The telephone number must

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be-

- (1) Monitored at all times the hazardous material is in transportation, including storage incidental to transportation;
- (2) The number of a person who is either knowledgeable of the hazardous material being shipped and has comprehensive emergency response and incident mitigation information for that material, or has immediate access to a person who possesses such knowledge and information; and
- (3) Entered on a shipping paper, as follows:
 - (i) Immediately following the description of the hazardous material required by subpart C of this part; or
 - (ii) Entered once on the shipping paper in a clearly visible location. This provision may be used only if the telephone number applies to each hazardous material entered on the shipping paper, and if it is indicated that the telephone number is for emergency response information (for example: "EMERGENCY CONTACT: ***).
- (b) The telephone number required by paragraph (a) of this section must be the number of the person offering the hazardous material for transportation or the number of an agency or organization capable of, and accepting responsibility for, providing the detailed information concerning the hazardous material. A person offering a hazardous material for transportation who lists the telephone number of an agency or organization shall ensure that agency or organization has received current information on the material, as required by paragraph (a)(2) of this section before it is offered for transportation.

13.2.11 Receipt Inspection

The requirements identified under this subelement are the responsibility of the FDH Contract level TP Organization and are contained in the FDH Contract level S/RID.

13.2.12 Transportation Operations

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 448

General transportation requirements.

- (a) Each shipment of Class 7 (radioactive) materials must be secured to prevent shifting during normal transportation conditions.
- (b) Except as provided in §§174.81, 176.83, and 177.848 of this subchapter, or as otherwise required by the competent authority in the applicable certificate, a package of Class 7 (radioactive)

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materials may be carried among packaged general cargo without special stowage provisions, if--

- (1) The heat output in watts does not exceed 0.1 times the minimum package dimension in centimeters; or
- (2) The average surface heat flux of the package does not exceed 15 watts per square meter and the immediately surrounding cargo is not in sacks or bags or otherwise in a form that would seriously impede air circulation for heat removal.
- (c) Packages bearing labels prescribed in §172.403 of this subchapter may not be carried in compartments occupied by passengers, except in those compartments exclusively reserved for couriers accompanying those packages.
- (d) Mixing of different kinds of packages that include fissile packages is authorized only in accordance with §173.459.
- (e) No person shall offer for transportation or transport aboard a passenger-carrying aircraft any single package with a transport index greater than 3.0 or an overpack with a transport index greater than 3.0.
- (f) No person shall offer for transportation or transport aboard a passenger-carrying aircraft any Class 7 (radioactive) material unless that material is intended for use in, or incident to, research, medical diagnosis or treatment.
- (g) If an overpack is used to consolidate individual packages of Class 7 (radioactive) materials, the packages must comply with the packaging, marking, and labeling requirements of this subchapter, and the following:
 - (1) The overpack must be labeled as prescribed in §172.403 of this subchapter, except as follows:
 - (i) The "contents" entry on the label may state "mixed" unless each inside package contains the same radionuclide(s);
 - (ii) The "activity" entry on the label must be determined by adding together the number of Becquerels (curies) of the Class 7 (radioactive) materials packages contained therein;
 - (iii) For a non-rigid overpack, the required label together with required package markings must be affixed to the overpack by means of a securely attached, durable tag. The transport index must be determined by adding together the transport indexes of the Class 7 (radioactive) materials packages contained therein; and
 - (iv) For a rigid overpack, the transport index must be determined by:

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- (A) Adding together the transport indexes of the Class 7 (radioactive) materials packages contained in the overpack; or
- (B) Except for fissile Class 7 (radioactive) materials, direct measurements as prescribed in §173.403 for transport index, taken by the person initially offering the packages contained within the overpack for shipment.
- (2) The overpack must be marked as prescribed in Subpart D of Part 172 of this subchapter and §173.25(a).
- (3) The transport index of the overpack may not exceed 3.0 for passenger-carrying aircraft shipments, or 10.0 for cargo-aircraft only shipments.

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 457

Transportation of fissile material, controlled shipments--specific requirements.

Shipments of fissile material packages that have been assigned a transport index of greater than 10 for criticality control purposes in accordance with 10 CFR 71.59 must meet the requirements of this section and §173.441(a) or (b).

(a) For fissile material, controlled shipments, the offeror or carrier, as appropriate, must incorporate transportation controls which:

- (1) Provide nuclear criticality safety;
- (2) Protect against loading, storing, or transporting that shipment with any other fissile material; and
- (3) Include in the shipping papers the description required by §172.203(d) of this subchapter.
- (b) Fissile material, controlled shipments must be transported:
 - (1) In an exclusive use conveyance;
 - (2) Except for shipments by aircraft, in a conveyance with an escort having the capability, equipment, authority, and instructions to provide administrative controls necessary to assure compliance with this section;
 - (3) In a conveyance containing no other packages of any Class 7 (radioactive) material required to bear one of the labels prescribed in §172.403 of this subchapter. Specific arrangements must be made between the offeror and the carrier, with instructions to that effect issued with the shipping papers; or

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(4) Under any other procedure approved by the Associate Administrator for Hazardous Materials Safety in accordance with Part 107 of this subchapter.

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 459

Mixing of fissile material packages.

(a) Mixing of fissile material packages with other types of Class 7 (radioactive) materials is authorized only if the transport index of any single package does not exceed 10 and the total transport index in any conveyance or storage location does not exceed 50.

(b) Fissile packages may be shipped with an external radiation level greater than 0.1 mSv/hr (10 mrem per hour) at 1 meter (3.3 feet), and combined with other packages of the same or different designs in a fissile material, controlled shipment, under the conditions prescribed in §173.457, if:

(1) Each package in the shipment has been assigned a transport index for criticality control purposes in accordance with the 10 CFR 71.59 ;

(2) The nuclear criticality control transport index does not exceed 10 for any single package;

(3) The total nuclear criticality control transport index does not exceed 100 for all packages in the shipment; and

(4) Except as provided in §176.704(e) of this subchapter, the shipment is not transported by vessel.

(c) A fissile material, controlled shipment of packages may be combined with other packages of the same or different design when each package has been assigned a nuclear criticality control transport index in accordance with 10 CFR 71.59, and may be combined with other fissile packages into a fissile material, controlled shipment under the conditions prescribed in §173.457, if:

(1) The nuclear criticality control transport index which has been assigned in the package approval does not exceed 50 for any single package;

(2) The total nuclear criticality control transport index for all packages in the shipment does not exceed 100; and

(3) Except as provided in §176.704(e) of this subchapter, the shipment is not transported by vessel.

REQUIREMENT SOURCE: 49 CFR 177, Dated 10-01-95, Part 848

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Segregation of hazardous materials.

(a) This section applies to materials which meet one or more of the hazard classes defined in this subchapter and are:

(1) In packages which require labels in accordance with part 172 of this subchapter;

(2) In a compartment within a multi-compartmented cargo tank subject to the restrictions in §173.33 of this subchapter; or

(3) In a portable tank loaded in a transport vehicle or freight container.

(b) When a transport vehicle is to be transported by vessel, other than a ferry vessel, hazardous materials on or within that vehicle must be stowed and segregated in accordance with §176.83(b) of this subchapter.

(c) In addition to the provisions of paragraph (d) of this section, cyanides or cyanide mixtures may not be loaded or stored with acids.

(d) Hazardous materials may not be loaded, transported, or stored together, except as provided in this section, and in accordance with the following Table:

{REFER TO 49CFR177.848(d) for Table}

13.2.12.1 Dangerous Waste Transportation

Transportation requirements related to offsite transportation of Dangerous Waste, as defined in WAC 173-303, are delineated within this section. Requirements associated with manifest requirements are contained within subelement 13.2.7.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 060(1)

Any person who generates, transports, offers for transport, or transfers a dangerous waste, or who owns or operates a dangerous waste TSD facility must have a current EPA/state identification number (EPA/state ID#). Any person who offers a dangerous waste to a transporter or to a dangerous waste TSD facility which does not have an EPA/state ID#, or whose EPA/state ID# has been cancelled or withdrawn, is in violation of this regulation.

13.2.12.2 Quality Assurance/Quality Control

REQUIREMENT SOURCE: 49 CFR 173, Dated 10-01-95, Part 475

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Quality control requirements prior to each shipment of Class 7 (radioactive) materials.

Before each shipment of any Class 7 (radioactive) materials package, the offeror must ensure, by examination or appropriate tests, that:

- (a) The packaging is proper for the contents to be shipped;
- (b) The packaging is in unimpaired physical condition, except for superficial marks;
- (c) Each closure device of the packaging, including any required gasket, is properly installed, secured, and free of defects;
- (d) For fissile material, each moderator and neutron absorber, if required, is present and in proper condition;
- (e) Each special instruction for filling, closing, and preparation of the packaging for shipment has been followed;
- (f) Each closure, valve, or other opening of the containment system through which the radioactive content might escape is properly closed and sealed;
- (g) Each packaging containing liquid in excess of an A2 quantity and intended for air shipment has been tested to show that it will not leak under an ambient atmospheric pressure of not more than 25 kPa, absolute (3.6 psia). The test must be conducted on the entire containment system, or on any receptacle or vessel within the containment system, to determine compliance with this requirement;
- (h) The internal pressure of the containment system will not exceed the design pressure during transportation; and
- (i) External radiation and contamination levels are within the allowable limits specified in this subchapter.

13.3 Offsite Safety

13.3.1 Package Standards and Certifications

The requirements identified under this subelement are the responsibility of the FDH Contract level TP organization and are contained in the FDH Contract level S/RID.

13.3.2 Safety Analyses

The requirements identified under this subelement are the responsibility of the FDH

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Contract level TP Organization and are contained in the FDH Contract level S/RID.

13.3.3 Design, Fabrication, Assembly and Testing QA for OffSite Shipping Containers

QA controls should be applied to the development and use of new shipping containers. These controls should ensure that the design and safety bases of the container are documented, reviewed and approved at the appropriate authority level.

No applicable services or requirements were identified within this subelement.

13.3.4 Physical Protection for Security

The requirements identified under this subelement are the responsibility of another FDH Contract level organization and are contained in the FDH Contract level S/RID.

13.3.5 Nuclear Explosives, Components, and Assemblies

No applicable requirements for the 324 Building were identified under this subelement.

13.4 Onsite Safety

Neither DOT nor NRC have requirements that govern onsite safety for packaging and transportation of hazardous materials. The Department of Labor has allowed that a company may elect to establish the safety requirements for protection of occupational workers. This, therefore, is the driver for establishing the onsite Transportation and Packaging program for the WTEL. The program is based on an "Equivalent Degree of Safety" to the DOT Regulations if not economically and technically feasible. Where compliance with DOT regulations is not feasible, compensatory administrative and technical requirements are specified to ensure equivalent safety to workers, the public, and the environment.

Onsite hazardous materials transportation must comply with the Department of Transportation Hazardous Materials Regulations, Title 49 CFR, Parts 171-180, or must contain all of the following provisions:

- 1) Provide containment of hazardous materials under conditions normally incident to transportation onsite.
- 2) Provide for communication to personnel handling the material prior to transport, such that the hazards of the materials being transferred can be assessed by emergency responders

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during incident response.

- 3) Provide for communication to alert bystanders or others authorized to be in the area, but who are not directly involved with such transfers.
- 4) Provide controls appropriate for the level of containment and communication.
- 5) Provide approved safety documentation that describes in detail the methodology and compliance process to meet onsite packaging and transportation safety requirements that demonstrates an acceptable risk to onsite workers, bystanders, public, or the environment.
- 6) Ensure that each hazmat employee shall receive function-specific training concerning requirements which are specifically applicable to the functions the employee performs.

WTEL personnel are responsible for the following:

- 1) Managing onsite shipments of hazardous material originating at the WTEL facility and making shipments in compliance with requirements and established procedures.
- 2) Coordinating with Traffic Operations all planned inbound and outbound offsite shipments of hazardous materials, including radioactive materials. Notifying Hazardous Materials Operations about pending radioactive material shipments that require road closure to transport packages approved only for onsite use over public access roadways on the Hanford Site.
- 3) Preparing written operating procedures incorporating applicable safety analysis documentation requirements to be used for the packaging, loading, transporting, and unloading of hazardous materials.
- 4) Packaging, loading, transporting, and unloading hazardous materials in approved packagings, as specified by approved procedures and instructions.
- 5) Transporting repetitive onsite shipments incidental to production (such as samples and waste) on vehicles assigned to the operating organizations.
- 6) Ensuring only appropriately trained and qualified personnel are used to inspect, load, monitor, certify, authorize, or transport hazardous material packages.
- 7) Visually inspecting the vehicle used to transport hazardous material for obvious defects and the vehicle inspection tags to ensure the Class A/B preventive maintenance is current.

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8) Preparing, maintaining, and retaining an annual inventory of reusable, and approved Type A and Radioactive material shipping packages (including packages approved only for onsite use by a SARP, SEP, or DAP). Ensuring the required periodic integrity inspection is current within the assigned period.

13.4.1 Coordination of Material Transfers

The applicable OSHA 1910 requirements are delineated in the Occupational Safety and Health Functional Area document.

13.4.2 Safety Analysis

1) DOT/DOE/NRC approved shipping containers loaded according to applicable requirements may be used for onsite transfers without further review.

2) SARPs, SEPs, or DAPs, together with the loading procedures and administrative controls, must demonstrate an acceptable risk that the transfer will provide an equivalent degree of safety to the DOT Regulations. Approval is required by Packaging Safety Engineering, Operations via the Plant Review Committee, Safety, Quality Assurance, and the FDH Approval Authority.

3) The Shipper of hazardous material is responsible for proper packaging loading, and verifying that the container is properly secured to the vehicle and in accordance with required tiedown procedures. The vehicle driver is responsible for securing containers to the vehicle in accordance with the tiedown procedure provided by the shipper. The vehicle driver shall also comply with the shipper's administrative requirements. The shipper is responsible for verifying the timely arrival of the container at it's destination.

13.4.3 Requirements for Potentially Explosive and Hazardous Materials

No requirements within this subelement were determined to be applicable to the 324 Building.

13.4.4 Personnel Protection During Movement of Hazardous Materials

All hazardous material shipments must utilize the marking, labeling, and placarding regulations contained in section 13.2.

The hazards communication regulations prior to transport are covered in chapter 19 under

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29 CFR 1910 Part 1200.

Written procedures are required for packaging, loading, transporting, and unloading all transfers of Type B and HRCQ radioactive materials. The procedures should be detailed to the extent of defining individual steps involved and serve as a basis for a checklist of the main steps to ensure procedural compliance.

Transfers of hazardous materials onsite, or offsite that do not meet DOT regulations, will be made only with approved safety documentation, and will utilize all the administrative controls required by the safety documentation. This may include blockading of the roadway to restrict non-involved workers or the public.

13.5 Key Interfaces

13.5.1 Training and Qualification

The FDH Contract level Technical Training Department provides guidance and assistance in developing training and qualification programs for organizations involved in P&T of hazardous materials. However, the TP Organization's Transportation Programs and Training Group prepares formal training courses and provides instruction to qualify FDH Contract level hazmat employees according to Department of Transportation (DOT), DOE, United States Environmental Protection Agency, and Washington State regulations.

The 324 Building management identifies hazmat employees and assures that they receive all required training. Training is provided by the FDH Contract level TP Organization.

13.5.2 Safeguards and Security

The Safeguards and Security organization provides escort services for shipments of special nuclear materials as required.

13.5.3 Nuclear Safety

Although nuclear safety is an area of significant interface with P&T, this is an inherent interface in that nuclear safety is a prominent factor in the regulations governing P&T of nuclear materials. However, consideration should be given to onsite P&T operations to ensure that the interaction with the nuclear safety program is carried through where administrative and technical controls are relied upon to satisfy the intent of DOT regulations in lieu of adhering to exact, sometimes unfeasible, requirements.

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13.5.4 Emergency Management

Coordination between the Transportation Program and the Emergency Management Functional Area is required to ensure that commonly handled hazardous materials are known and included in emergency plans for the site and that special equipment or vehicles for transportation are known and available for emergency situations.

13.6 References

13.6.1 Requirement Source Documents

For references, see attached report titled "RIDs by Document X-Reference Listing".

13.6.2 Reviewed Documents Not Used as Requirement Sources

The following documents were reviewed as requirement sources but were not used in the development of this S/RID.

Occupational Safety and Health Standards, Subpart Z, Toxic and Hazardous Substances Hazard Communication Standard, 05-27-92

10 CFR, Part 71, Packaging and Transportation of Radioactive Material, 01-01-93

10 CFR, Part 20, Standards for Protection against Radiation, 01-01-93

49 CFR, Subtitle B - Other Regulations Relating to Transportation, - Continued, Parts 178 to 199, 10-01-92

49 CFR, Subtitle B - Other Regulations Relating to Transportation - Continued, Parts 200 to 399, 10-01-92

DOE Order 1540.1A, Materials Transportation and Traffic Management, 07-08-92

DOE Order 1540.2, Hazardous Material Packaging for Transport - Administrative Procedures, 09-30-86

DOE Order 5480.3, Safety Requirements for the Packaging and Transportation of Hazardous Materials, Hazardous Substances, and Hazardous Wastes, 07-09-85

DOE Order 5820.2A, Radioactive Waste Management, 09-26-88

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WAC-470-12-050, Transportation of Dangerous Cargoes, Advisory Committee on, (filed 3/21/60)

RIDs by Document X-Reference Listing
Based on 324-PT-SD RID and including all documents.

40 CFR 761, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions, Dated 07-01-95

49 CFR 171, General Information, Regulations, and Definitions, Dated 10-01-95

49 CFR 172, Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information and Training Requirements, Dated 10-01-95

49 CFR 173, Shippers -- General Requirements for Shipments and Packagings, Dated 10-01-95

49 CFR 177, Carriage by Public Highway., Dated 10-01-95

WAC 173-303, Dangerous Waste Regulations, Dated 11-01-95

***** End of RIDs by Document X-Reference Listing *****

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ENVIRONMENTAL RESTORATION

14.0 Environmental Restoration

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements, applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC

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are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

JUSTIFICATION FOR FUNCTIONAL AREA NONAPPLICABILITY

With the near-term mission of the 324 building as stated in the scope statement above, Environmental Restoration activities are not planned within the near future. Environmental Restoration activities are not within the scope of the FDH contract, therefore, development of an Environmental Restoration Functional Area is not appropriate.

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DECONTAMINATION AND DECOMMISSIONING

15.0 Decontamination and Decommissioning

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC

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DECONTAMINATION AND DECOMMISSIONING

are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

JUSTIFICATION FOR FUNCTIONAL AREA NONAPPLICABILITY

With the near-term mission of the 324 building as stated above, decontamination and decommission activities are not planned within the near future. Decontamination and decommission activities are not within the scope of the FDH contract, therefore, development of a Decontamination and Decommission Functional Area is not appropriate.

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WASTE MANAGEMENT

16.0 Waste Management

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements, applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The Waste Management Program defined in this document is described in general accordance with the Environment, Safety, and Health Configuration Guide, Revision 0, dated July 30, 1993, and is presented in program elements and subelements. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

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WASTE MANAGEMENT**

This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract site level S/RID. For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

16.1 Waste Characterization and Certification

16.1.1 High Level Radioactive Waste

This section is not applicable to the 324 Building.

16.1.2 TRU Waste

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WASTE MANAGEMENT**

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.a.(2)

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. The mass of the waste container including shielding shall not be used in calculating the specific activity of the waste.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.a.(4)

Mixed transuranic waste:

(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.

(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.

(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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.c.(3)

All transuranic waste certification sites shall prepare a certification plan which describes how the

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waste meets each waste acceptance criterion described in the WIPP-DOE-069 (see Attachment 1, page 3, paragraph 18).

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.c.(4)

Each certification plan shall define controls and other measures to ensure that each element of the certification plan is performed adequately as described. Requirements for these quality assurance activities are described in the WIPP-DOE-120 (see Attachment 1, page 2, paragraph 19).

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.c.(6)

The Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee shall submit certification and associated quality assurance plans to the state of New Mexico's Environmental Evaluation Group for review and comment prior to granting formal approval of such plans.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.c.(7)

The Environmental Evaluation Groups'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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.c.(8)

Approved certification and associated quality assurance plans shall be implemented by the generating sites using specific, written operational procedures.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.c.(9)

Certification activities conducted under approved plans and procedures shall be audited periodically, in accordance with a written audit program plan on a continuing basis by the Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee. An Environmental Evaluation Group representative may accompany the Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee audit team as an observer during site audits. The Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee may grant certifying authority to the site following successful completion of an audit.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.c.(10)

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The Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee shall issue a formal audit report to the responsible field organization following the completion of an audit. The audit report shall describe the activities of the Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee audit team and include a record of any findings, observations, and recommendations. Corrective actions taken as a result of a finding shall be verified on subsequent audits. The Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee shall institute a tracking system to ensure timely resolution of findings, observations, recommendations, and the resultant corrective actions.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.c.(11)

Failure to resolve and close out previous audit findings and recommendations or sending noncomplying waste to the Waste Isolation Pilot Plant when judged by the Waste Acceptance Criteria Certification Committee to be a serious violation, shall result in suspension of certifying authority, pending satisfactory resolution.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.g.(6)

Certified waste from off site generators does not require additional waste analysis or interim inspection, either upon receipt at the storage site or at the time of shipment to the Waste Isolation Pilot Plant. The generator of the certified waste is responsible for describing the waste form and waste package content.

16.1.3 Low-Level Radioactive Waste

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.d.(1)

Low-level waste shall be characterized with sufficient accuracy to permit proper segregation, treatment, storage, and disposal. 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.d.(2)

Waste characterization data shall be recorded on a waste manifest, as required by paragraph 3.m., and shall include:

- (a) The physical and chemical characteristics of the waste;
- (b) Volume of the waste (total of waste and any solidification or absorbent media);
- (c) Weight of the waste (total of waste and any solidification or absorbent media);
- (d) Major radionuclides and their concentrations;
- (e) Packaging date, package weight, and external volume.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.d.(3)

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The concentration of a radionuclide may be determined by direct methods or by indirect methods such as use of scaling factors which relate the inferred concentration of one radionuclide to another that is measured, or radionuclide material accountability, if there is reasonable assurance that the indirect methods can be correlated with actual measurements.

16.1.4 Mixed/Dangerous Waste

REQUIREMENT SOURCE: 40 CFR 268, Dated 07-01-95, Part 7(a) Intro

Except as specified in §268.32, if a generator's waste is listed in 40 CFR part 261, subpart D, the generator must test his waste, or test an extract using test method 1311 (the Toxicity Characteristic Leaching Procedure, described in ``Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,'` EPA Publication SW-846 as incorporated by reference in §260.11 of this chapter), or use knowledge of the waste, to determine if the waste is restricted from land disposal under this part. Except as specified in §268.32, if a generator's waste exhibits one or more of the characteristics set out at 40 CFR part 261, subpart C, the generator must test an extract using test method 1311 (the Toxicity Characteristic Leaching Procedure, described in ``Test Methods for Evaluating Solid Waste, Physical/Chemical Methods'` (SW-846)), or use knowledge of the waste, to determine if the waste is restricted from land disposal under this Part.

If the generator determines that his waste exhibits the characteristic of ignitability (D001) (and is not in the High TOC Ignitable Liquids Subcategory or is not treated by CMBST or RORGS of §268.42, Table 1), and/or the characteristic of corrosivity (D002), and/or reactivity (D003), and/or the characteristic of organic toxicity (D012-D043), and is prohibited under §268.37, §268.38, and §268.39, the generator must determine the underlying hazardous constituents (as defined in §268.2, in the D001, D002, D003, or D012-D043 wastes.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 070(2)(a)

Once a material has been determined to be a dangerous waste, then any solid waste generated from the recycling, treatment, storage, or disposal of that dangerous waste is a dangerous waste unless and until:

- (i) The generator has been able to accurately describe the variability or uniformity of the waste over time, and has been able to obtain demonstration samples which are representative of the waste's variability or uniformity; and
- (ii)(A) It does not exhibit any of the characteristics of WAC 173-303-090; however, wastes that exhibit a characteristic at the point of generation may still be subject to the requirements of WAC 173-303-140 (2)(a), even if they no longer exhibit a characteristic at the point of land disposal; and
- (B) If it was a listed waste under WAC 173-303-080 through 173-303-083, it also has been exempted pursuant to WAC 173-303-910(3); or

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(iii) If originally designated only through WAC 173-303-100, it does not meet any of the criteria of WAC 173-303-100.

Such solid waste will include but not be limited to any sludge, spill residue, ash emission control dust, leachate, or precipitation run-off. Precipitation run-off will not be considered a dangerous waste if it can be shown that the run-off has not been contaminated with the dangerous waste, or that the run-off is adequately addressed under existing state laws (e.g. chapter 90.48 RCW), or that the run-off does not exhibit any of the criteria or characteristics described in WAC 173-303-100.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 070(2)(b)

Materials that are reclaimed from solid wastes and that are used beneficially (as provided in WAC 173-303-016 and 173-303-017) are not solid wastes and hence are not dangerous wastes under this section unless the reclaimed material is burned for energy recovery or used in a manner constituting disposal.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 070(3)

Designation procedures.

(a) To determine whether or not a solid waste is designated as a dangerous waste a person must:

(i) First, determine if the waste is a listed discarded chemical product, WAC 173-303-081;

(ii) Second, determine if the waste is a listed dangerous waste source, WAC 173-303-082;

(iii) Third, if the waste is not listed in WAC 173-303-081 or 173-303-082, or for the purposes of compliance with the federal land disposal restrictions as adopted by reference in WAC 173-303-140, determine if the waste exhibits any dangerous waste characteristics, WAC 173-303-090; and

(iv) Fourth, if the waste is not listed in WAC 173-303-081 or 173-303-082, and does not exhibit a characteristic in WAC 173-303-090, determine if the waste meets any dangerous waste criteria, WAC 173-303-100.

(b) A person must check each section, in the order set forth, until they determine whether the waste is designated as a dangerous waste. Once the waste is determined to be a dangerous waste, further designation is not required except as required by subsection (4) or (5) of this section. If a person has checked the waste against each section and the waste is not designated, then the waste is not subject to the requirements of chapter 173-303 WAC.

Any person who wishes to seek an exemption for a waste which has been designated DW or EHW

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must comply with the requirements of WAC 173-303-072.

(c) For the purpose of determining if a solid waste is a dangerous waste as identified in WAC 173-303-080 through 173-303-100, a person must either:

(i) Test the waste according to the methods, or an approved equivalent method, set forth in WAC 173-303-110; or

(ii) Apply knowledge of the waste in light of the materials or the process used, when:

(A) Such knowledge can be demonstrated to be sufficient for determining whether or not it designated and/or designated properly; and

(B) All data and records supporting this determination in accordance with WAC 173-303-210(3) are retained on-site.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 070(4)

Testing required. Notwithstanding any other provisions of this chapter, the department may require any person to test a waste according to the methods, or an approved equivalent method, set forth in WAC 173-303-110 to determine whether or not the waste is designated under the dangerous waste lists, characteristics, or criteria, WAC 173-303-080 through 173-303-100. Such testing may be required if the department has reason to believe that the waste would be designated DW or EHW by the dangerous waste lists, characteristics, or criteria, or if the department has reason to believe that the waste is designated improperly (e.g., the waste has been designated DW but should actually be designated EHW). If a person, pursuant to the requirements of this subsection, determines that the waste is a dangerous waste or that its designation must be changed, then they are subject to the applicable requirements of this chapter 173-303 WAC. The department will base a requirement to test a waste on evidence that includes, but is not limited to:

(a) Test information indicating that the person's waste may be DW or EHW;

(b) Evidence that the person's waste is very similar to another persons' already designated DW or EHW;

(c) Evidence that the persons' waste has historically been a DW or EHW;

(d) Evidence or information about a person's manufacturing materials or processes which indicate that the wastes may be DW or EHW; or

(e) Evidence that the knowledge or test results a person has regarding a waste is not sufficient for determining whether or not it designated and/or designated properly.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 070(5)

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Additional designation required. A generator must manage dangerous waste under the most stringent management standards that apply. Subsections (5)(a) and (c) of this section describe how waste that has been designated as DW under the dangerous waste lists, WAC 173-303-080 through 173-303-082, or characteristics, WAC 173-303-090, must also be designated under the dangerous waste criteria, WAC 173-303-100, because designation under the criteria may change how the waste must be managed. Additional designation is required when:

- (a) The waste is designated as DW with a QEL of 220 pounds and the generator otherwise qualifies as a small quantity generator. In this case, a generator must determine if their DW is also designated as a toxic EHW, WAC 173-303-100, with a QEL of 2.2 pounds; or
- (b) The waste is designated as DW and the waste is to be discharged to a POTW operating under WAC 173-303-802(4) (Permits by rule). In this case, a generator must determine if the waste is also an EHW under WAC 173-303-100; or
- (c) The waste is designated as a state-only DW and the waste is to be:
 - (i) Burned for energy recovery, as used oil, under the provisions of WAC 173-303-515; or
 - (ii) Land disposed within the state. In this case, a generator must determine if the waste is also an EHW under WAC 173-303-100.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 070(6)

Dangerous waste numbers. When a person is reporting or keeping records on a dangerous waste, they must use all the dangerous waste numbers which they know are assignable to the waste from the dangerous waste lists, characteristics, or criteria. For example, if the waste is ignitable and contains extremely hazardous concentrations of halogenated hydrocarbons, they must use the dangerous waste numbers of D001 and WP01. This will not be construed as requiring a person to designate their waste beyond those designation requirements set forth in subsections (2), (3), (4), and (5) of this section.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 081(1)

A waste will be designated as a dangerous waste if it is handled in any of the manners described in (e) of this subsection, and if it is a residue from the management of:

- (a) A commercial chemical product or manufacturing chemical intermediate which has the generic name listed in the discarded chemical products list, WAC 173-303-9903;
- (b) An off-specification commercial chemical product or manufacturing chemical intermediate which if it had met specifications would have the generic name listed in the discarded chemical products list, WAC 173-303-9903;

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(c) Any containers, inner liners, or residue remaining in a container or in an inner liner removed from a container that has held any commercial chemical product or manufacturing chemical intermediate that has, or any off-specification commercial chemical product or manufacturing chemical intermediate which if it had met specifications would have, the generic name listed on the "P" discarded chemical products list of WAC 173-303-9903, unless the containers or inner liners are empty as described in WAC 173-303-160(2);

(d) Any residue or contaminated soil, water, or other debris resulting from the cleanup of a spill of a commercial chemical product or manufacturing chemical intermediate which has, or of an off-specification commercial chemical product or manufacturing chemical intermediate which if it had met specifications would have, the generic name listed in the discarded chemical products list, WAC 173-303-9903;

(e) The materials or items described in (a), (b), (c), and (d) of this subsection are dangerous wastes when they are:

(i) Discarded or intended to be discarded as described in WAC 173-303-016 (3)(b)(i);

(ii) Burned for purposes of energy recovery in lieu of their original intended use;

(iii) Used to produce fuels in lieu of their original intended use;

(iv) Applied to the land in lieu of their original intended use; or

(v) Contained in products that are applied to the land in lieu of their original intended use.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 081(3)

Dangerous waste numbers and mixtures. A waste which has been designated as a discarded chemical product dangerous waste must be assigned the dangerous waste number or numbers listed in WAC 173-303-9903 next to the generic chemical or chemicals which caused the waste to be designated. If a person mixes a solid waste with a waste that would be designated as a discarded chemical product under this section, then the entire mixture must be designated. The mixture designation is the same as the designation for the discarded chemical product which was mixed with the solid waste. For example, a mixture containing 2.2 lbs. (1 kg) of Aldrin (dangerous waste number P004, DW designation, QEL of 2.2 lbs.) and 22 lbs. (10 kg) of a solid waste, would be designated DW, and identified as acute hazardous waste. The mixture would have the dangerous waste number P004.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 082(1)

The dangerous waste sources list appears in WAC 173-303-9904. Any waste that is listed or is a residue from the management of a waste listed on the dangerous waste sources list must be

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designated a dangerous waste, and identified as DW.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 082(3)

Care should be taken in the proper designation of these wastes and of mixtures of these wastes and solid wastes. If a person mixes a solid waste with a waste that would be designated as a dangerous waste source under this section, then the entire mixture is designated as a dangerous waste source. The mixture has the same designation (DW), and the same dangerous waste number as the dangerous waste source which was mixed with the solid waste.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 082(4)

40 CFR Part 261 Appendix VII "Basis for Listing Hazardous Waste" is adopted by reference.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 090(2)

Representative samples. The department will consider a sample obtained using any of the applicable sampling methods described in WAC 173-303-110(2), sampling and testing methods, to be a representative sample.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 090(3)

Equivalent test methods. The testing methods specified in this section are the only acceptable methods, unless the department approves an equivalent test method in accordance with WAC 173-303-910(2).

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 090(4)

Quantity exclusion limit. A solid waste is a dangerous waste if it exhibits one or more of the dangerous waste characteristics described in subsections (5), (6), (7), and (8) of this section. If a person's solid waste exhibits one or more of these characteristics, then he or she is a dangerous waste generator (and may not be considered a small quantity generator as provided in WAC 173-303-070(8)) if the quantity of their waste exceeds 220 lbs. (100 kg) per month or per batch.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 090(5)

Characteristic of ignitability.

(a) A solid waste exhibits the characteristic of ignitability if a representative sample of the waste has any of the following properties:

(i) It is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume, and has a flash point less than 60 degrees C (140 degrees F), as determined by a Pensky-Martens Closed Cup Tester, using the test method specified in ASTM Standard D-93-79 or D-93-80, or a

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Setaflash Closed Cup Tester, using the test method specified in ASTM Standard D-3278-78;

(ii) It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard;

(iii) It is an ignitable compressed gas as defined in 49 CFR 173.300 and as determined by the test methods described in that regulation; or,

(iv) It is an oxidizer as defined in 49 CFR 173.151.

(b) A solid waste that exhibits the characteristic of ignitability must be designated DW, and assigned the dangerous waste number of D001.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 090(6)

Characteristic of corrosivity.

(a) A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has any one or more of the following properties:

(i) It is aqueous, and has a pH less than or equal to 2, or greater than or equal to 12.5, using Method 9040 or 9041 in "Test Methods for Evaluating Solid Waste (SW 846), Physical/Chemical Methods", available from the department;

(ii) It is liquid, and corrodes steel (SAE 1020) at a rate greater than 0.250 inch (6.35 mm) per year at a test temperature of 55 degrees C (130 degrees F) as determined by the test method specified in NACE (National Association of Corrosion Engineers) Standard TM-01-69 as standardized in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods." The NACE Standard is available from the department; or

(iii) It is solid or semi-solid, and when mixed with an equal weight of water results in a solution, the liquid portion of which has the property specified in (a)(i) of this subsection. Procedures for preparing and extracting the solution and liquid are described in the test procedures of WAC 173-303-110 (3)(a).

(b) A solid waste that exhibits the characteristic of corrosivity because:

(i) It has either of the properties described in (a)(i) or (ii) of this subsection will be designated DW, and assigned the dangerous waste number of D002;

(ii) It only has the property described in (a)(iii) of this subsection will be designated DW, and assigned the dangerous waste number of WSC2.

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REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 090(7)

Characteristic of reactivity.

(a) A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has any of the following properties:

- (i) It is normally unstable and readily undergoes violent change without detonating;
 - (ii) It reacts violently with water;
 - (iii) It forms potentially explosive mixtures with water;
 - (iv) When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment;
 - (v) It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5 can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment;
 - (vi) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement;
 - (vii) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure; or
 - (viii) It is a forbidden explosive as defined in 49 CFR 173.51, or a Class A explosive as defined in 49 CFR 173.53, or a Class B explosive as defined in 49 CFR 173.88.
- (b) A solid waste that exhibits the characteristic of reactivity must be designated DW, and assigned the dangerous waste number of D003.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 090(8)

Toxicity characteristic.

(a) A solid waste exhibits the toxicity characteristic if, using the "Toxicity Characteristic Leaching Procedure" (TCLP, found in Appendix II of 40 CFR Part 261, which is adopted by reference, or available upon request from the department) or equivalent methods approved by the department under WAC 173-303-110(5), the extract from a representative sample of the waste contains any of the contaminants listed in the toxicity characteristic list in (c) of this subsection, at concentrations equal to or greater than the respective value given in the list. When the waste contains less than 0.5 percent filterable solids, the waste itself, after filtering using the methodology outlined in the TCLP, is considered to be the extract for the purpose of this subsection.

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(b) A solid waste that exhibits the toxicity characteristic has the dangerous waste number specified in the list which corresponds to the toxic contaminant causing it to be dangerous.

(c) Toxicity characteristic list. Any waste that contains contaminants which occur at concentrations at or above the DW threshold must be designated DW.

(SEE WAC 173-303, Section 090(8) for Table)

*1 If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used.

*2 Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 100(3)

A person must use data which is available to him, and, when such data is inadequate for the purposes of this section, must refer to the NIOSH RTECS to determine:

(a) Toxicity data or toxic category for each known constituent in the waste;

(b) Whether or not each known constituent of the waste is a halogenated hydrocarbon or a polycyclic aromatic hydrocarbon as defined in WAC 173-303-040.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 100(5) and (5)(a)

Toxicity criteria. Except as provided in WAC 173-303-070 (4) or (5), a person must determine if a solid waste meets the toxicity criteria under this section by following either the instructions for book designation, when his knowledge of the waste is sufficient, or by testing the waste using the biological testing methods adopted under WAC 173-303-110(3).

(a) Except as provided in WAC 173-303-070 (4), if a person knows only some of the toxic constituents in the waste or only some of the constituent concentrations, and if the waste is undesignated for those known constituents or concentrations, then the waste is not designated for toxicity under this subsection.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 100(5)(b)

Book designation procedure. A person may determine if a waste meets the toxicity criteria by following the book designation instructions as follows:

(i) A person must determine the toxic category for each known constituent. The toxic category for each constituent may be determined from available data, or by obtaining data from the NIOSH

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RTECS and checking this data against the toxic category table, below. If data is available for more than one of the toxicity criteria (fish, oral, inhalation, or dermal), then the data indicating severest toxicity must be used, and the most acutely toxic category must be assigned to the constituent. If the NIOSH RTECS or other data sources do not agree on the same category, then the category arrived at using the NIOSH RTECS will be used to determine the toxic category. If toxicity data for a constituent cannot be found in the NIOSH RTECS, or other source reasonably available to a person, then the toxic category need not be determined for that constituent.

(SEE WAC 173-303, Section 100(5)(b) for Table)

* The $LC < subscript > 50$ data must be from an exposure period greater than or equal to twenty-four hours. $LC < subscript > 50$ data from any species is acceptable, however, if salmonid $LC < subscript > 50$ data is available it will supersede all other fish data. If salmonid data is unavailable but fathead minnow data is available, it will supersede all other fish species data.

Note: "Inhalation $LC < subscript > 50$ " means a concentration in milligrams of substance per liter of air which, when administered to the respiratory tract for four hours or less, kills within fourteen days half of a group of ten rats each weighing between 200 and 300 grams.

(ii) A person whose waste contains one or more toxic constituents must determine the equivalent concentration for the waste from the following formula:

(SEE WAC 173-303, Section 100(5)(b) for Formulas and rest of (ii))

(iii) A person whose waste contains toxic constituents must determine its designation according to the value of the equivalent concentration:

(A) If the equivalent concentration is less than 0.001%, the waste is not a toxic dangerous waste; or

(B) If the equivalent concentration is equal to or greater than 0.001% and less than 1.0%, the person will designate the waste as DW and assign the dangerous waste number WT02; and

(C) If the equivalent concentration is equal to or less than 0.01%, the DW may also be a special waste; or

(D) If the equivalent concentration is equal to or greater than 1.0%, the person will designate the waste as EHW and assign the dangerous waste number WT01.

Example 1. Continued. The equivalent concentration of 0.031% (from Example 1. above) is greater than 0.001% and less than 0.1%. The waste is DW and the dangerous waste number WT02 must be assigned. Since 0.031% is also greater than 0.01%, the waste is not a special waste.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 100(5)(c)

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Designation from bioassay data. A person may determine if a waste meets the toxicity criteria by following the bioassay designation instructions of either:

(i) The DW bioassay. To determine if a waste is DW, a person must establish the toxicity category range (D category toxicity or greater toxicity) of a waste by means of the 100 mg/L acute static fish test or the 5000 mg/kg oral rat test, as described in the biological testing methods (bioassay) adopted in WAC 173-303-110(3). If data from the test indicates that the waste is DW, then the person will assign the dangerous waste number WT02. Otherwise, the waste is not regulated as toxic dangerous waste. No further testing must be done except as provided in WAC 173-303-070 (4) and (5), or if the person chooses to determine whether the waste is EHW, or in the case of state-only solid dangerous waste, if the person chooses to determine whether the waste is special waste; or

(ii) The EHW and special waste bioassay. To determine if a waste is EHW, a person must establish the toxicity category range of a waste by means of the fish bioassay at 10 mg/L or the rat bioassay at 50 mg/L, as described in the biological testing methods (bioassay) adopted in WAC 173-303-110(3).

(NOTE: A fish bioassay at 1 mg/L corresponds with the proposed definition of EHW, which includes toxic categories X-B. However, the fish bioassay is not reproducible at these low levels.)

If data from the test indicates that the waste is EHW, then the person will assign the dangerous waste number WT01. Otherwise, the waste will be designated DW, and the person will assign the dangerous waste number WT02. A person with state-only solid waste may choose to test a waste to determine if it is special waste. Testing levels for special waste must be at 10 mg/L for the fish bioassay or 500 mg/L for the oral rat bioassay. No further testing must be done except as provided in WAC 173-303-070 (4) and (5), or if the person chooses to test the waste in accordance with WAC 173-303-100 (5)(c)(i) to determine if the waste is not regulated as toxic dangerous waste.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 100(5)(d)

If the designation acquired from book designation and bioassay data do not agree, then bioassay data will be used to designate a waste. If a waste is designated as DW or EHW following the book designation procedure, a person may test the waste by means of the biological testing methods (bioassay) adopted under WAC 173-303-110(3), using either the static acute fish or the acute oral rat method, to demonstrate that the waste is not a dangerous waste or should be designated as DW and not EHW.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 100(5)(e)

A waste designated as DW by toxicity criteria must be assigned the dangerous waste number of WT02. A waste designated as EHW by toxicity criteria must be assigned the dangerous waste number of WT01.

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REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 100(6) and (6)(a)

Persistence criteria. For the purposes of this section, persistent constituents are chemical compounds which are either halogenated hydrocarbons (HH), or polycyclic aromatic hydrocarbons (PAH), as defined under WAC 173-303-040. Except as provided in WAC 173-303-070 (4) or (5), a person may determine the identity and concentration of persistent constituents by either applying knowledge of the waste or by testing the waste according to the chemical testing methods for complying with the dangerous waste regulation adopted under WAC 173-303-110(3).

(a) Except as provided in WAC 173-303-070 (4), if a person knows only some of the persistent constituents in the waste, or only some of the constituent concentrations, and if the waste is undesignated for those known constituents or concentrations, then the waste is not designated for persistence under this subsection.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 100(6)(b)

When a waste contains one or more halogenated hydrocarbons (HH) for which the concentrations are known, the total halogenated hydrocarbon concentration must be determined by summing the concentration percentages for all of the halogenated hydrocarbons for which the concentrations are known.

Example 2. A waste contains: Carbon tetrachloride - .009%; DDT - .012%; 1,1,1-trichloroethylene - .020%. The total halogenated hydrocarbon concentration would be:

Total HH Concentration (%) = .009% + .012% + .020% = .041%

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 100(6)(c)

A person whose waste contains polycyclic aromatic hydrocarbons (PAH) as defined in WAC 173-303-040, must determine the total PAH concentration by summing the concentration percentages of each of the polycyclic aromatic hydrocarbons for which they know the concentration.

Example 3. A person's waste contains: Chrysene - .08%; 3,4-benzo(a)pyrene - 1.22%. The total polycyclic aromatic hydrocarbon concentration would be:

Total PAH Concentration (%) = .08% + 1.22% = 1.30%

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 100(6)(d)

A person whose waste contains halogenated hydrocarbons and/or polycyclic aromatic hydrocarbons must determine its designation from the persistent dangerous waste table or persistent dangerous waste criteria graph WAC 173-303-9907.

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(SEE WAC 173-303, Section 100(6)(d) for Table)

* No DW concentration level for PAH.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 104(2)

Characteristics. A waste which exhibits any of the dangerous waste characteristics, WAC 173-303-090, must be assigned the dangerous waste number corresponding to the characteristic(s) exhibited by the waste.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 104(3)

Criteria. The following table must be used for assigning dangerous waste numbers to wastes designated by the dangerous waste criteria at WAC 173-303-100.

(SEE WAC 173-303, Section 104(3) for Table)

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 110(2)(a)

The methods and equipment used for obtaining representative samples of a waste will vary with the type and form of the waste. The department will consider samples collected using the sampling methods below or the most recent version of such methods for wastes with properties similar to the indicated materials, to be representative samples of the wastes:

- (i) Crushed or powdered material - ASTM Standard D346-75;
- (ii) Extremely viscous liquid - ASTM Standard D140-70;
- (iii) Fly ash-like material - ASTM Standard D2234-86;
- (iv) Soil-like material - ASTM Standard D1452-80 (Reapproved 1990);
- (v) Soil or rock-like material - ASTM Standard D420-93;
- (vi) Containerized liquid wastes - "COLIWASA" described in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, revised July 1982, as amended by Update 1 (April 1984) and Update 2 (April 1985); and,
- (vii) Liquid waste in pits, ponds, lagoons, and similar reservoirs - "Pond Sampler" described in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods," SW-846, revised July 1982, as amended by Update 1 (April 1984) and Update 2 (April 1985).

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 110(5)

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Equivalent testing methods. Any person may request the department to approve an equivalent testing method by submitting a petition, prepared in accordance with WAC 173-303-910(2), to the department.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 140(2)(a)

Land disposal restrictions for wastes designated in accordance with WAC 173-303-070 (3)(a)(i), (ii), and (iii) are the restrictions set forth by the Environmental Protection Agency in 40 CFR Part 268 which are incorporated by reference into this regulation and the restrictions set forth in subsections (3) through (7) of this section. The words "regional administrator" (in 40 CFR) will mean the "department." The exemption and exception provisions of subsections (3) through (7) are not applicable to the federal land disposal restrictions.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 150(1)

Any action taken to evade the intent of this regulation by dividing or diluting wastes to change their designation shall be prohibited, except for the purposes of treating, neutralizing, or detoxifying such wastes.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 150(2)

Separation of a homogeneous waste into heterogeneous phases (e.g., separation of a suspension into sludge and liquid phases, or of a solvent/water mixture into solvent and water phases, etc.) will not be considered as division, provided that the person generating the waste either:

- (a) Designates the homogeneous waste before separation, and handles the entire waste accordingly; or
- (b) Designates each phase of the heterogeneous waste, in accordance with the dangerous waste designation requirements of this chapter, and handles each phase accordingly.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 150(3)

For the purposes of designation, quantities of continuously generated wastes must be summed monthly. All wastes generated less frequently than once a month will be considered as batch or single event wastes.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 170(1) and (1)(a)

A person is a dangerous waste generator if their solid waste is designated by the requirements of WAC 173-303-070 through 173-303-100.

- (a) The generator is responsible for designating their waste as DW or EHW.

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REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 170(1)(b)

The generator may request an exemption for their dangerous waste according to the procedures of WAC 173-303-072.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 170(2)

A dangerous waste generator must notify the department and obtain an EPA/state identification number as required by WAC 173-303-060, and must comply with the requirements of WAC 173-303-170 through 173-303-230.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 170(4)

The generator must comply with the special land disposal restrictions for certain dangerous wastes in WAC 173-303-140.

16.2 Packaging and Labeling Compliance

The requirements for packaging and labeling of radioactive and hazardous wastes are covered in the Packaging and Transportation Functional Area.

16.3 Transportation

Additional Waste transportation regulations are covered in the Packaging and Transportation Functional Area.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.g.(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. Off site shipment of low-level waste shall be in compliance with DOE 1540.1.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.g.(3)

Generators must receive advance approval from the receiving facility and shall certify prior to shipment that waste meets the receiving facility waste acceptance criteria. The certification program shall be auditable and able to withstand independent review.

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REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.g.(4)

Each package of waste must comply with the labeling requirements of DOE 1540.1.

16.4 Plans, Records and Reporting

Plans and recordkeeping for environmental monitoring and releases are included in the Environmental Protection Functional Area.

16.4.1 Low-Level Radioactive Waste

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.m.(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. The data maintained shall include all data necessary to show that the waste was properly classified, treated, stored, shipped, and/or disposed of. The data maintained in the system shall be based on the data recorded on waste manifests.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.m.(2)

Waste Manifest. Records shall be kept and accompany each waste package from generator through final disposal. The manifest shall contain data necessary to document the proper classification, and assist in determining proper treatment, storage, and disposal of the waste. Waste manifests will be kept as permanent records. At a minimum, the following data will be included:

- (a) Waste physical and chemical characteristics,
- (b) Quantity of each major radionuclide present,
- (c) Weight of the waste (total of waste and any solidification or absorbent media),
- (d) Volume of waste (total of waste and any solidification or absorbent media), and
- (e) Other data necessary to demonstrate compliance with waste acceptance criteria.

16.4.2 Mixed/Dangerous Waste

Contingency planning per WAC-173-303-350 is covered in the Emergency Management Functional Area. Dangerous waste management records and Closure Plans are covered in this subelement.

REQUIREMENT SOURCE: TRIPARTY AGREEMENT, Revision 6, Part 5, Article XXXVI, Section 113

Each Party to this Agreement shall preserve for a minimum of ten (10) years after termination of

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this Agreement all of the records in its or its contractors possession related to sampling, analysis, investigations, and monitoring conducted in accordance with this Agreement. After this ten year period, DOE shall notify the EPA and Ecology at least forty-five (45) days prior to destruction or disposal of any such records. Upon request, the Parties shall make such records or true copies available, to the other Parties subject to Article XLV (Classified and Confidential Information).

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 210(1)

The generator must keep a copy of each manifest signed by the initial transporter in accordance with WAC 173-303-180(3), manifest procedures, for three years, or until he receives a signed copy from the designated facility which received the waste. The signed facility copy must be retained for at least five years from the date the waste was accepted by the initial transporter.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 210(2)

The generator must keep a copy of each annual report and exception report as required by WAC 173-303-220 for a period of at least five years from the due date of each report. The generator must keep a copy of his most recent notification (Form 2) until he is no longer defined as a generator under this chapter.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 210(3)

Waste designation records.

(a) The generator must keep records of any test results, waste analyses, or other determinations made in accordance with WAC 173-303-170(1) for designating dangerous waste for at least five years from the date that the waste was last transferred for on-site or off-site treatment, storage, or disposal.

(b) At a minimum, test results must include:

- (i) The sample source, sampling date, and sampling procedure used;
- (ii) The laboratory performing the test;
- (iii) The testing date, and testing method used;
- (iv) The analytical result, or the quantitative range of the testing method for analytes not detected.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 210(4)

Any other records required for generators accumulating wastes on-site as described in WAC 173-303-170 (4)(b) or 173-303-200 must be retained for at least five years, including, but not limited to such items as inspection logs.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 210(5)

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The periods of retention for any records described in this section will be automatically extended during the course of any unresolved enforcement action requiring those records or upon request by the director.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 210(6)

All generator records, including plans required by this chapter, will be made available and furnished upon request by the director.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 220 Introduction and (1)

The generator must submit the following reports to the department by the specified due date for each report, or within the time period allowed for each report.

(1) Annual reports.

(a) A generator or any person who has obtained an EPA/state identification number pursuant to WAC 173-303-060 must submit an annual report to the department, on the Dangerous Waste Annual Report according to the instructions on the form (copies are available from the department), no later than March 1 for the preceding calendar year.

(b) In addition, any generator who stores, treats, or disposes of dangerous waste on-site must comply with the annual reporting requirements of WAC 173-303-390, Facility reporting.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 220(2)

Exception reports.

(a) A generator who does not receive a copy of the manifest with the handwritten signature of the owner/operator of the designated facility within thirty-five days of the date the waste was accepted by the initial transporter must contact the transporter(s) and/or facility to determine the status of the dangerous waste shipment.

(b) A generator must submit an exception report to the department if he has not received a copy of the manifest with the handwritten signature of the owner/operator of the designated facility within forty-five days of the date the waste was accepted by the initial transporter.

(c) The exception report must include:

(i) A legible copy of the manifest for which the generator does not have confirmation of delivery; and

(ii) A cover letter signed by the generator or his representative explaining the efforts taken to locate the waste and the results of those efforts.

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(d) The department may require a generator to submit exception reports in less than forty-five days if it finds that the generator frequently or persistently endangers public health or the environment through improper waste shipment practices.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 300(4)

Analysis must be repeated as necessary to ensure that it is accurate and current. At a minimum, analysis must be repeated:

- (a) When the owner or operator has been notified, or has reason to believe, that the process or operation generating the dangerous waste, or nondangerous wastes if applicable under WAC 173-303-610 (4)(d), has significantly changed; and
- (b) When a dangerous waste received at an off-site facility does not match the identity of the waste specified on the manifest or the shipping paper.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 300(5)

Waste analysis plan. The owner or operator must develop and follow a written waste analysis plan which describes the procedures he will use to comply with the waste analysis requirements of subsections (1), (2), (3), and (4) of this section. He must keep this plan at the facility, and the plan must contain at least:

- (a) The parameters for which each dangerous waste, or nondangerous waste if applicable under WAC 173-303-610 (4)(d), will be analyzed, and the rationale for selecting these parameters;
- (b) The methods of obtaining or testing for these parameters;
- (c) The methods for obtaining representative samples of wastes for analysis (representative sampling methods are discussed in WAC 173-303-110(2));
- (d) The frequency with which analysis of a waste will be reviewed or repeated to ensure that the analysis is accurate and current;
- (e) The waste analyses which generators have agreed to supply;
- (f) Where applicable, the methods for meeting the additional waste analysis requirements for specific waste management methods as specified in WAC 173-303-400(3) which incorporates by reference the regulations in 40 CFR Part 265 Subparts F through R 265.1034, 265.1063, 268.4(a) and 268.7 for interim status facilities and in WAC 173-303-140 (4)(b), 173-303-395(1), 173-303-630 through 173-303-670, and 40 CFR 264.1034, 264.1063, 268.4(a) and 268.7 for final status facilities;

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- (g) For off-site facilities, the waste analysis that dangerous waste generators have agreed to supply;
- (h) For surface impoundments exempted from land disposal restrictions under 40 CFR 268.4(a), incorporated by reference in WAC 173-303-140(2), the procedures and schedules for:
 - (i) The sampling of impoundment contents; (ii) The analysis of test data; and (iii) The annual removal of residues that are not delisted under 40 CFR 260.22 or which exhibit a characteristic of hazardous waste and either:
- (A) Do not meet applicable treatment standards of 40 CFR Part 268, Subpart D; or (B) Where no treatment standards have been established;
- (I) Such residues are prohibited from land disposal under 40 CFR 268.32 or RCRA section 3004(d); or
- (II) Such residues are prohibited from land disposal under 40 CFR 268.33(f).

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 395(2)

Compliance with other environmental protection laws and regulations. In receiving, storing, handling, treating, processing, or disposing of dangerous wastes, the owner/operator must design, maintain and operate his dangerous waste facility in compliance with all applicable federal, state and local laws and regulations (e.g., control of stormwater or sanitary water discharge, control of volatile air emissions, etc.).

16.5 Permitting

Additional requirements are included in the Environmental Protection Functional Area, section 20.2.3.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 395(4)

Loading and unloading areas. TSD facilities which receive or ship manifested shipments of liquid dangerous waste for treatment, storage or disposal must provide for and use an area (or areas) for loading and unloading waste shipments. The loading and unloading area(s) must be designed, constructed, operated and maintained to:

- (a) Contain spills and leaks that might occur during loading or unloading;
- (b) Prevent release of dangerous waste or dangerous waste constituents to ground or surface waters;
- (c) Contain wash waters (if any) resulting from the cleaning of contaminated transport vehicles and

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load/unload equipment; and

(d) Allow for removal, as soon as possible, of collected wastes resulting from spills, leaks and equipment cleaning (if any) in a manner which assures compliance with (b) of this subsection.

16.6 Waste Acceptance Criteria

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.e.(3)

Generators of waste shall implement a low-level waste certification program to provide assurance that the waste acceptance criteria for any low-level waste treatment, storage, or disposal facility used by the generator are met. Generators and facilities receiving the waste are jointly responsible for assuring compliance with waste acceptance criteria. Generators are financially responsible for actions required due to nonconformance.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.e.(5)

The waste acceptance criteria for storage, treatment, or disposal facilities shall address the following issues:

- (a) Allowable quantities/concentrations of specific radioisotopes to be handled, processed, stored, or disposed of;
- (b) Criticality safety requirements (waste forms and geometries);
- (c) Restrictions regarding low-level waste classified for security reasons;
- (d) External radiation and internal heat generation;

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- (e) Restrictions on the generation of harmful gases, vapors, or liquids in waste;
- (f) Chemical and structural stability of waste packages, radiation effects, microbial activity, chemical reactions, and moisture;
- (g) Restrictions for chelating and complexing agents having the potential for mobilizing radionuclides; and
- (h) Quantity of free liquids.

16.7 Waste Minimization

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.b.(1)

Technical and administrative controls shall be directed to reducing the gross volume of waste generated and/or the amount of radioactivity requiring disposal. 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. Volume reduction techniques, such as incineration, compaction, extraction, and shredding, shall be implemented wherever cost effective and practical. Treatment facilities shall be permitted by the appropriate regulatory authority.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.b.(2)

Transuranic waste shall be assayed or otherwise evaluated to determine the kinds and quantities of transuranic radionuclides present prior to storage. Additionally, hazardous waste components shall be estimated or analyzed, whichever is appropriate.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.b.(3)

Mixed transuranic waste shall be treated, where feasible and practical, to destroy the hazardous waste component.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.b.(4)

Transuranic waste that is classified for security reasons shall be treated to remove or destroy the classified characteristic(s) prior to certification. Declassification should be performed by the generator.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.c.(1)

Technical and administrative controls shall be directed to reducing the gross volume of waste generated and/or the amount of radioactivity requiring disposal. Waste reduction efforts shall

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include consideration of process modification, process optimization, materials substitution and decontamination.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.c.(2)

Waste Generation Reduction. 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.c.(3)

Waste Segregation. Each DOE-low-level waste generator shall separate uncontaminated waste from low-level waste to facilitate cost effective treatment and disposal.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.c.(4)

Waste Minimization. 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.

REQUIREMENT SOURCE: WAC 173-307, Dated 05-02-91, Section 030 WAC Plans Paragraph 1

Plan requirements. This section establishes the specific elements required to be included in a plan. The purpose of a plan is to require serious consideration of ways in which processes and procedures may be modified to reduce dependence upon hazardous substances and/or the generation of hazardous wastes. All plans must consider opportunities based on the following priorities: Hazardous substance use reduction and hazardous waste reduction, recycling, and treatment. The plans shall consist of the following parts:

REQUIREMENT SOURCE: WAC 173-307, Dated 05-02-91, Section 030 WAC Plans Part (1)

Part One. Part one shall include:

- (a) A written policy articulating management and corporate support for the plan and a commitment to implement planned activities and achieve established goals.
- (b) The plan scope and objectives.
- (c) A description of the facility type, a description of product(s) made and/ or services provided, and a statement or listing of the current level(s) of production or service activity in units of measure appropriate to the industry or activity;
- (d) A general overview of the processes used in production or service activities (a schematic

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drawing may be included);

(e) A statement providing, for the last calendar year, the total pounds of extremely hazardous waste and total pounds of dangerous waste reported on Form 4, Generator Annual Dangerous Waste Report, and, if applicable, the total pounds of toxic releases reported on Form R under SARA Title III, Section 313; and

(f) A description of current reduction, recycling, and treatment activities and documentation of hazardous substance use reduction and hazardous waste reduction efforts completed prior to the first plan due date specified in WAC 173-307-050. Clearly separate the explanations of reduction activities from recycling and other management activities.

REQUIREMENT SOURCE: WAC 173-307, Dated 05-02-91, Section 030 WAC Plans Part (2)

Part two shall include an identification of hazardous substances used and hazardous wastes generated by the facility, a description of the facility processes, an identification of reduction, recycling, and treatment opportunities, an evaluation of those opportunities, a selection of proposed options, a policy to prevent shifting of risks, performance goals, and an implementation schedule. Specifically, Part two shall include:

(a) An identification of products containing hazardous substances used and hazardous wastes generated. This is to be based on actual usage and generation during the most recent calendar year for which records are available. This task can be accomplished by choosing one of two approaches. The approaches are identified as the "pounds approach" and the "percentage approach." Look at the following descriptions and requirements of each of these and determine which one you wish to use.

(i) "Pounds approach."

This approach requires you to identify the types and amounts, in either weight or volume, of hazardous waste generated and products containing hazardous substances used up to these threshold levels:

(A) All dangerous waste streams five hundred pounds or greater, any smaller dangerous waste streams which individually represents ten percent or more of the total annual hazardous wastes, and all extremely hazardous waste streams subject to regulation by the department. If this combination equals less than ninety percent of the total hazardous wastes generated, then additional dangerous wastes generated at the facility shall be included until ninety percent of the total is reached; and

(B) Each product used which contains a total of fifty percent or more of any combination of hazardous substances if one thousand pounds or more was used; each product used which contains a total of between twenty-five percent and forty-nine percent of hazardous substances if four thousand pounds or more was used; and each product used which contains a total of between ten and twenty-four percent of hazardous substances if ten thousand pounds or more was used. Any

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product which contains less than ten percent of any hazardous substances need not be included in the list regardless of the amount of the product used.

(C) Office products and products which are used at the facility for nonprocess routine janitorial or grounds maintenance related activities may be excluded from this list.

(D) Hazardous substances used and hazardous wastes generated in laboratory research need not be listed. Note: See Part two, (k) of this subsection for discussion on this issue.

(ii) "Percentage approach."

This approach requires you to identify the types and amounts, in either weight or volume, of hazardous waste generated and products containing hazardous substances used up to these threshold levels;

(A) All extremely hazardous waste and enough additional dangerous waste to reach ninety percent of all the hazardous waste generated; and

(B) Ninety percent of all the products used which contain hazardous substances. This selection of products should attempt to include those that contain the highest concentrations of hazardous substances and the most toxic hazardous substances.

(C) Office products and products which are used at the facility for nonprocess routine janitorial or grounds maintenance related activities may be excluded from this list.

(D) Hazardous substances used and hazardous wastes generated in laboratory research need not be listed. Note: See Part two, (k) of this subsection for discussion on this issue.

(iii) Determinations of whether these quantities are met or exceeded for either approach shall be based on the best available information. This information may be included or referenced in the plan. Available information may include any or all of the following as necessary to determine quantities of hazardous substances contained in products; information available from material safety data sheets, information furnished upon request from manufacturers or suppliers of hazardous substances or products containing hazardous substances, information obtained from the department, and information otherwise known by the facility owner or operator.

An explanation of the procedures used to determine that the thresholds were met or exceeded must be included in this section of the plan.

(iv) The above thresholds shall only be used for plans required to be completed prior to September 2, 1996. Plans or plan updates completed from that date on must identify the types and amounts, in either weight or volume, of hazardous waste generated and hazardous substances used up to the following threshold levels;

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(A) The "pounds approach" can only be used for identifying hazardous waste after September 2, 1996. This approach cannot be used for products containing hazardous substances. The thresholds for hazardous waste are:

All dangerous waste streams five hundred pounds or greater, any smaller dangerous waste streams which individually represents ten percent or more of the total annual hazardous wastes, and all extremely hazardous waste streams subject to regulation by the department. If this combination equals less than ninety-five percent of the total hazardous wastes generated, then additional dangerous wastes generated at the facility shall be included until ninety-five percent of the total is reached.

(B) The "percentage approach" remains an optional approach for hazardous waste, but it is the only approach that can be used for products. The thresholds for this approach are:

All extremely hazardous waste and enough additional dangerous waste to reach ninety-five percent of all the hazardous waste generated; and

Ninety-five percent of all the products used which contain hazardous substances.

(C) The exemptions in subitems (C) and (D) of item (ii) of this subdivision remain in effect.

(b) A detailed description of each process in the facility that generates hazardous waste or uses products containing hazardous substances as identified in the chosen approach in (a) of this subsection. This description may include a schematic drawing.

(c) For the hazardous waste and products containing hazardous substances identified in (a) of this subsection within each of the processes identified in (b) of this subsection, an identification, based on thorough research, of all reasonable opportunities for further hazardous substance use reduction, hazardous waste reduction, recycling, and treatment. Thorough research shall include, at a minimum, a review of literature commonly available to that industry or trade. The full range of potentially feasible opportunities is to be identified without regard to possible impediments to implementing the opportunities. In identifying opportunities, consideration shall be given to alternative approaches which, in the judgment of the facility management, satisfy the same demand for end products or services but use substantially less hazardous substances or result in the generation of substantially less hazardous waste;

(d) An evaluation of the identified opportunities. Opportunities shall be grouped by priority and evaluated according to these priorities. The priorities are, in descending order: Hazardous substance use and hazardous waste reduction; recycling; and, treatment. Opportunities of a lower priority shall be given consideration only after a determination is made that the higher priority opportunities are inappropriate due to impediments to their implementation. Impediments that shall be considered acceptable include, but are not limited to: Adverse impacts on product quality, legal or contractual obligations, economic and technical practicality, safety considerations, and the creation of substantial new risks to human health or the environment.

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Except with respect to the use and distribution of fertilizers or pesticides intended for commercial agricultural applications, the evaluation of hazardous waste reduction opportunities must include an evaluation of hazardous substance use reduction opportunities for those hazardous substances which subsequently result in hazardous waste streams as well as an evaluation of other opportunities for the reduction of hazardous waste.

The evaluation required under this subsection shall include an economic analysis, a technical evaluation, an identification of whether, and if so how, the identified opportunity would result in a shifting of risk(s) from one part of a process, environmental medium, or product to another and an identification of all impediments to implementing the opportunities. The economic analysis shall seek to identify the total costs associated with the current hazardous substance use and hazardous waste generation, management and disposal, compared with comparable costs associated with implementing the alternatives.

Evaluation of each opportunity may be considered complete when enough information is available to select or reject the opportunity for implementation. For opportunities rejected, the reason(s) for rejecting them shall be stated.

(e) A selection of opportunities to be implemented in accordance with the evaluation conducted in (d) of this subsection. For each selected opportunity, the process(es) it affects shall be identified, and estimates of the amount, by weight, of the reduction of hazardous substances or products containing hazardous substances and hazardous waste reduction which would be achieved through implementation shall be stated, as well as the amount of hazardous wastes recycled or treated as a result of implementation shall be included;

(f) A written policy stating that in implementing the selected options whenever technically and economically practicable, risks will not be shifted from one part of a process, environmental medium, or product to another;

(g) Specific performance goals in each of the following categories, expressed in numeric terms:

(i) Hazardous substances or products containing hazardous substances to be reduced or eliminated from use;

(ii) Hazardous wastes to be reduced or eliminated through hazardous waste reduction techniques;

(iii) Materials or hazardous wastes to be recycled; and

(iv) Hazardous wastes to be treated.

If the establishment of numeric performance goals is not practicable, the performance goals shall include a clearly stated list of objectives designed to lead to the establishment of numeric goals as soon as is practicable. Goals shall be set for a five-year period from the first reporting date (see (h)

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of this subsection regarding implementation activities that will take longer than five years);

(h) A five-year implementation schedule, which shall display planned implementation activities for each of the five calendar years following completion of the plan. Information to be provided shall include, but is not limited to, the opportunities (or phases of opportunities) being implemented and related milestones. Where complete implementation of a selected opportunity will take longer than five years, the schedule shall contain relevant milestones within a five-year period and an estimated date of completion. The schedule may be in table form and organized by opportunities within processes, if desired.

(i) A description of how those hazardous wastes that are not recycled or treated and the residues from recycling and treatment processes are managed may be included in the plan.

(j) Documentation of any research conducted in fulfillment of any of the above subdivisions of this subsection shall be available to the department upon request.

(k) For research laboratories, the plan may include, in lieu of all the detailed requirements of this subsection, a description of policies and procedures to be followed by laboratory personnel regarding the use of hazardous substances and the generation of hazardous wastes through laboratory research. These policies and procedures must be consistent with the waste reduction priorities as defined in this chapter.

REQUIREMENT SOURCE: WAC 173-307, Dated 05-02-91, Section 030 WAC Plans Part (3)

Part three shall provide a financial description of the plan, which shall identify costs and benefits realized from implementing selected opportunities to the extent reasonably possible. Part three shall also include a description of accounting systems which will be used to identify hazardous substance use and hazardous waste management costs. Liability, compliance, and oversight costs must be components of these accounting systems.

REQUIREMENT SOURCE: WAC 173-307, Dated 05-02-91, Section 030 WAC Plans Part (4)

Part four of the plan shall include a description of personnel training and employee involvement programs. Each facility require to write a plan is encouraged to advise its employees of the planning process and solicit comments or suggestions from its employees on hazardous substance use and waste reduction opportunities.

16.8 Waste Treatment and Disposal Technology

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.f.(1)

Waste shall be treated by appropriate methods so that the disposal site can meet the performance objectives stated in paragraph 3.a.

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REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.f.(2)

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. 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.f.(3)

The development of large scale waste treatment facilities shall be supported by the appropriate National Environmental Policy Act documentation in addition to the following:

- (a) A document shall be prepared that analyzes waste streams needing treatment, treatment options considered, and a rationale for selection of proposed treatment processes;
- (b) A construction design report including projected waste throughput and treatment methods, construction and operating cost estimates; and
- (c) A Safety Analysis Report.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.f.(4)

Operation of waste treatment facilities shall be supported by adequate documentation including the following:

- (a) Operation and maintenance procedures;
- (b) Personnel training and qualification procedures;
- (c) Monitoring and emergency response plans; and
- (d) Records shall be maintained for each package of low-level waste that enters and leaves the treatment facility.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.i.(4)

Disposition of waste designated as greater-than-class C, as defined in 10 CFR 61.55, must be

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handled as special cases. 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.i.(5) and (5)(a)

The following are additional disposal requirements intended either to improve stability of the disposal site or to facilitate handling and provide protection of the health and safety of personnel at the disposal site:

(a) Waste must not be packaged for disposal in cardboard or fiberboard boxes, unless such boxes meet DOT requirements and contain stabilized waste with a minimum of void space. For all types of containers, void spaces within the waste and between the waste and its packaging shall be reduced as much as practical.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 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. This does not apply to radioactive gaseous waste packaged as identified in paragraph 3.i.(5)(e).

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.i.(5)(e)

Waste in a gaseous form must be packaged at a pressure that does not exceed 1.5 atmospheres at 20°C.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.i.(5)(f)

Waste must not be pyrophoric. Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable.

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16.9 Radiological Performance Assessment

Not applicable; 324 Building is not a disposal facility.

16.10 Waste Categories

The 324 Building does not store or dispose of PCB waste and does not generate transuranic waste, only collects and removes the TRU waste which has already been generated. If PCBs are encountered in the future the S/RID will be revised to incorporate applicable requirements.

16.10.1 High Level Radioactive Waste

This section is not applicable to the 324 Building.

16.10.2 TRU Waste

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.e. Introduction and 3.e.(1)

(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:

(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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.e.(3)

Transuranic waste in storage areas shall be protected from unauthorized access.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.e.(5)

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Transuranic waste storage facilities shall be designed, constructed, maintained, and operated to minimize the possibilities of fire, explosion, or accidental release of radioactive and/or hazardous components of the waste to the environment.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.e.(7)

Transuranic waste shall be stored in such a way so as to maintain radiation exposures as low as reasonably achievable.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.g.(3)

Existing interim storage sites shall be reviewed for consistency with the items in paragraph 3.g.(2). Any necessary corrective actions shall be performed based on a compliance schedule approved by appropriate regulatory authorities.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.g.(4)

Certified waste shall be stored in a manner unlikely to alter the certification of the waste package.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter II, Section 3.g.(5)

Operators of interim storage facilities shall receive data package information (see Attachment 1, page 2, paragraphs 18 and 20) for each waste package from the generator. The operator shall store the waste generator's data and shall use the data to prepare a new Data Package at the time of shipment to the Waste Isolation Pilot Plant.

16.10.3 Low-Level Radioactive Waste

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.a.(2)

Assure that external exposure to the waste and concentrations of radioactive material which may be released into surface water, ground water, soil, plants and animals results in an effective dose equivalent that does not exceed 25 mrem/yr to any member of the public. Releases to the atmosphere shall meet the requirements of 40 CFR 61. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.h.

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Long-Term Storage.

- (1) Low-level waste shall be stored by appropriate methods, to achieve the performance objectives stated in paragraph 3a.
- (2) Records shall be maintained for all low-level waste that enters and leaves the storage facility, (see paragraph 3m).
- (3) The development and operation of a waste storage facility shall be supported by the following documentation (two or more of these may be combined for convenience):
 - (a) An analysis which identifies the need for the storage facility;
 - (b) A Construction Design Report, including projected waste planned for storage; construction and operating cost estimates;
 - (c) A Safety Analysis Report and appropriate National Environmental Policy Act documentation; and
 - (d) Operational procedures and plans.
- (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.

16.10.4 Mixed/Dangerous Waste

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 141(1)

A person may offer a designated dangerous waste only to a TSD facility which is operating either: Under a permit issued pursuant to the requirements of this chapter; or, if the TSD facility is located outside of this state, under interim status or a permit issued by United States EPA under 40 CFR Part 270, or under interim status or a permit issued by another state which has been authorized by United States EPA pursuant to 40 CFR Part 271.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 141(2)

A person may offer a state only designated dangerous waste (not regulated as a hazardous waste by EPA) to a facility which is located outside of this state and which does not meet the requirements of subsection (1) of this section if:

- (a) The facility receiving the waste will legitimately treat or recycle the dangerous waste (disposal is an unacceptable management practice);

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- (b) The generator has on file a letter or copy of a letter signed by the regulatory authority in the receiving state that the receiving facility may accept the waste;
- (c) The generator uses a transporter with a valid EPA/state identification number;
- (d) The generator complies with all other applicable requirements, including manifesting, packaging and labeling, with respect to the shipping of the waste. However, the EPA/state identification number for the receiving facility is not required on the manifest or annual report; and
- (e) The generator receives from the receiving facility a signed and dated copy of the manifest.

16.10.4.1 Interim Status Standards

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 283(3)

Performance standards. Unless authorized by state, local, or federal laws, or unless otherwise authorized in this regulation, the owner/operator must design, construct, operate, or maintain a dangerous waste facility that to the maximum extent practical given the limits of technology prevents:

- (a) Degradation of ground water quality;
- (b) Degradation of air quality by open burning or other activities;
- (c) Degradation of surface water quality;
- (d) Destruction or impairment of flora and fauna outside the active portion of the facility;
- (e) Excessive noise;
- (f) Conditions that constitute a negative aesthetic impact for the public using rights of ways, or public lands, or for landowners of adjacent properties;
- (g) Unstable hillsides or soils as a result of trenches, impoundments, excavations, etc.;
- (h) The use of processes that do not treat, detoxify, recycle, reclaim, and recover waste material to the extent economically feasible; and
- (i) Endangerment of the health of employees, or the public near the facility.

16.10.4.2 Management of Containers

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 160(1)

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Waste quantity. Containers and inner liners will not be considered as a part of the waste when measuring or calculating the quantity of a dangerous waste. Only the weight of the residues in nonempty or nonrinsed containers or inner liners will be considered when determining waste quantities.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 160(2)

A container or inner liner is "empty" when:

(a) All wastes in it have been taken out that can be removed using practices commonly employed to remove materials from that type of container or inner liner (e.g., pouring, pumping, aspirating, etc.) and, no more than one inch of waste remains at the bottom of the container or inner liner, or the volume of waste remaining in the container or inner liner is equal to three percent or less of the container's total capacity, or, if the container's total capacity is greater than one hundred ten gallons, the volume of waste remaining in the container or inner liner is no more than 0.3 percent of the container's total capacity. A container which held compressed gas is empty when the pressure inside the container equals or nearly equals atmospheric pressure; and

(b) If the container or inner liner held acutely hazardous waste, as defined in WAC 173-303-040, toxic EHW as defined in WAC 173-303-100 or pesticides bearing the danger or warning label, the container or inner liner has been rinsed at least three times with an appropriate cleaner or solvent. The volume of cleaner or solvent used for each rinsing must be ten percent or more of the container's or inner liner's capacity or of sufficient quantity to thoroughly decontaminate the container. In lieu of rinsing for containers that might be damaged or made unusable by rinsing with liquids (e.g., fiber or cardboard containers without inner liners), an empty container may be vacuum cleaned, struck, with the open end of the container up, three times (e.g., on the ground, with a hammer or hand) to remove or loosen particles from the inner walls and corners, and vacuum cleaned again. Equipment used for the vacuum cleaning of residues from containers or inner liners must be decontaminated before discarding, in accordance with procedures approved by the department.

Any rinsate or vacuumed residue which results from the cleaning of containers or inner liners must, whenever possible, be reused in a manner consistent with the original intended purpose of the substance in the container or inner liner. In the case of a farmer, if the rinsate is a pesticide residue then the rinsate must be managed or reused in a manner consistent with the instructions on the pesticide label, provided that when the label instructions specify disposal or burial, such disposal or burial must be on the farmer's own (including rented, leased or tenanted) property. Otherwise, the rinsate must be checked against the designation requirements (WAC 173-303-070 through 173-303-100) and, if designated, managed according to the requirements of this chapter.

(c) In the case of a container, the inner liner, that prevented the container from contact with the commercial chemical product or manufacturing chemical, has been removed.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 160(3)

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Any residues remaining in containers or inner liners that are "empty" as described in subsection (2) of this section will not be subject to the requirements of this chapter, and will not be considered as accumulated wastes for the purposes of calculating waste quantities. Any dangerous waste in either: A container that is not empty, or an inner liner removed from a container that is not empty (as defined in subsection (2) of this section) is subject to the requirements of this chapter.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 160(4)

A person may petition the department to approve alternative container rinsing processes in accordance with WAC 173-303-910(1).

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 161

Small containers of dangerous waste may be placed in overpacked drums (or labpacks) provided that the following conditions are met:

(1) Dangerous waste must be packaged in nonleaking inside containers. The inside containers must be of a design and constructed of a material that will not react dangerously with, be decomposed by, or be ignited by the contained waste. Inside containers must be tightly and securely sealed and, to the extent possible, should be full and have as little air as possible in them to minimize voids. The inside containers must be of the size and type specified in the Department of Transportation (DOT) hazardous materials regulations (49 CFR Parts 173, 178, and 179), if those regulations specify a particular inside container for the waste;

(2) The inside containers must be overpacked in an open head DOT-specification drum shipping container which meets all of the requirements of 49 CFR Parts 173, 178, and 179. The overpack container must not exceed a capacity of 416-liter (110 gallon). The overpack container must have a sufficient quantity of sorbent material to completely sorb all of the liquid contents of the inside containers. The sorbent in overpack containers to be placed in a landfill must be nonbiodegradable in accordance with WAC 173-303-140 (4)(b)(iv). The outer container must be full after it has been packed with inside containers and sorbent material;

(3) The sorbent material used must not be capable of reacting dangerously with, being decomposed by, or being ignited by the contents of the inside containers, in accordance with WAC 173-303-395 (1)(b);

(4) Incompatible wastes, as defined in WAC 173-303-040, must not be placed in the same outside container; and

(5) Reactive wastes, other than cyanide- or sulfide-bearing waste as defined in WAC 173-303-090 (7)(a)(v), must be treated or rendered nonreactive prior to packaging in accordance with subsections (1) through (4) of this section. Cyanide- and sulfide-bearing reactive waste may be packed in accordance with subsections (1) through (4) of this section without first being treated or

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rendered nonreactive.

(6) An itemized listing of the chemicals, their concentrations and quantities per labpack must be kept by the generator and must be readily available in case of an emergency during shipment, and for the purposes of preparing annual reports under WAC 173-303-220.

(7) Such disposal is in compliance with the requirements of WAC 173-303-140 (2)(a). Persons who incinerate labpacks according to the requirements in 40 CFR 268.42(c)(1) (incorporated by reference at WAC 173-303-140 (2)(a)) may use fiber drums in place of metal outer containers. Such fiber drums must meet the DOT specifications in 49 CFR 173.12 and be overpacked according to the requirements in subsection (2) of this section.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 200(1) and (1)(a)

A generator, not to include transporters as referenced in WAC 173-303-240(3), may accumulate dangerous waste on-site without a permit for ninety days or less after the date of generation, provided that:

(a) All such waste is shipped off-site to a designated facility or placed in an on-site facility which is permitted by the department under WAC 173-303-800 through 173-303-845 or recycled or treated on-site in ninety days or less. The department may, on a case-by-case basis, grant a maximum thirty day extension to this ninety day period if dangerous wastes must remain on-site due to unforeseen, temporary and uncontrollable circumstances. A generator who accumulates dangerous waste for more than ninety days is an operator of a storage facility and is subject to the facility requirements of this chapter and the permit requirements of this chapter as a storage facility unless he has been granted an extension to the ninety day period allowed pursuant to this subsection;

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 200(1)(b)

(i) The waste is placed in containers and the generator complies with WAC 173-303-630 (2), (3), (4), (5), (6), (8), (9), and (10). For container accumulation (including satellite areas as described in subsection (2) of this section), the department may require that the accumulation area include secondary containment in accordance with WAC 173-303-630(7), if the department determines that there is a potential threat to public health or the environment due to the nature of the wastes being accumulated, or due to a history of spills or releases from accumulated containers. In addition, any new container accumulation areas (but not including new satellite areas, unless required by the department) constructed or installed after September 30, 1986, must comply with the provisions of WAC 173-303-630(7); or

(ii) The waste is placed in tanks and the generator complies with WAC 173-303-640 (2) through (10), except WAC 173-303-640 (8)(c) and the second sentence of WAC 173-303-640 (8)(a).

(Note: A generator, unless otherwise required to do so, does not have to prepare a closure plan, a cost estimate for closure, or provide financial responsibility for his tank system to satisfy the

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requirements of this section.)

Such a generator is exempt from the requirements of WAC 173-303-620 and 173-303-610, except for WAC 173-303-610 (2) and (5); or

(iii) The waste is placed on drip pads and the generator complies with WAC 173-303-675 and maintains the following records at the facility:

(A) A description of procedures that will be followed to ensure that all wastes are removed from the drip pad and associated collection system at least once every 90 days; and

(B) Documentation of each waste removal, including the quantity of waste removed from the drip pad and the sump or collection system and the date and time of removal; and/or

(iv) The waste is placed in containment buildings and the generator complies with 40 CFR Part 265 Subpart DD, which is incorporated by reference, and the generator has placed its professional engineer certification that the building complies with the design standards specified in 40 CFR 265.1101 in the facility's operating record no later than sixty days after the date of initial operation of the unit. After February 18, 1993, PE certification will be required prior to operation of the unit. The owner or operator shall maintain the following records at the facility:

(A) A written description of procedures to ensure that each waste volume remains in the unit for no more than ninety days, a written description of the waste generation and management practices for the facility showing that they are consistent with respecting the ninety-day limit, and documentation that the procedures are complied with; or

(B) Documentation that the unit is emptied at least once every 90 days.

In addition, such a generator is exempt from all the requirements in WAC 173-303-610 and 173-303-620, except for WAC 173-303-610(2).

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 200(1)(c)

The date upon which each period of accumulation begins is marked and clearly visible for inspection on each container;

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 200(1)(d)

While being accumulated on site, each container and tank is labeled or marked clearly with the words "dangerous waste" or "hazardous waste." Each container or tank must also be marked with a label or sign which identifies the major risk(s) associated with the waste in the container or tank for employees, emergency response personnel and the public (Note: If there is already a system in use that performs this function in accordance with local, state, or federal regulations, then such system will be adequate). The department may also require that a sign be posted at each entrance

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to the accumulation area, bearing the legend, "danger--unauthorized personnel keep out," or an equivalent legend, written in English, and legible from a distance of twenty-five feet or more; and

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 200(1)(e)

The generator complies with the requirements for facility operators contained in:

(i) WAC 173-303-330 through 173-303-360 (personnel training, preparedness and prevention, contingency plan and emergency procedures, and emergencies) except for WAC 173-303-355 (SARA Title III coordination); and

(ii) WAC 173-303-320 (1), (2)(a), (b), (d), and (3) (general inspection); and

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 200(1)(f)

The generator complies with 40 CFR 268.7(a)(4) (waste analysis plan when treating waste to meet treatment standards for land disposal restrictions).

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(2)

Condition of containers. If a container holding dangerous waste is not in good condition (e.g., severe rusting, apparent structural defects) or if it begins to leak, the owner or operator must transfer the dangerous waste from the container to a container that is in good condition or manage the waste in some other way that complies with the requirements of chapter 173-303 WAC. In addition, the owner or operator must address leaks and spills in accordance with the applicable provisions of WAC 173-303-145 and 173-303-360.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(3)

Identification of containers. The owner or operator must label containers in a manner which adequately identifies the major risk(s) associated with the contents of the containers for employees, emergency response personnel and the public (Note: If there is already a system in use that performs this function in accordance with local, state or federal regulations, then such system will be adequate). The owner or operator must affix labels upon transfer of dangerous wastes from one container to another. The owner or operator must destroy or otherwise remove labels from the emptied container, unless the container will continue to be used for storing dangerous waste at the facility. The owner or operator must ensure that labels are not obscured, removed, or otherwise unreadable in the course of inspection required under WAC 173-303-320.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(4)

Compatibility of waste with containers. The owner or operator must use a container made of or lined with materials which will not react with, and are otherwise compatible with, the dangerous waste to be stored, so that the ability of the container to contain the waste is not impaired.

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REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(5)

Management of containers.

- (a) A container holding dangerous waste must always be closed, except when it is necessary to add or remove waste.
- (b) A container holding dangerous waste must not be opened, handled, or stored in a manner which may rupture the container or cause it to leak.
- (c) A minimum thirty-inch separation is required between aisles of containers holding dangerous waste(s). A row of drums must be no more than two drums wide.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(6)

Inspections. At least weekly, the owner or operator must inspect areas where containers are stored, looking for leaking containers and for deterioration of containers and the containment system caused by corrosion, deterioration, or other factors. The owner or operator must keep an inspection log including at least the date and time of the inspection, the printed name and the handwritten signature of the inspector, a notation of the observations made and the date and nature of any repairs or remedial actions taken. The log must be kept at the facility for at least five years from the date of inspection.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(7) and (7)(a)

Containment.

- (a) Container storage areas must have a containment system that is capable of collecting and holding spills and leaks. In addition to the necessary leak containment capacity, uncovered storage areas must be capable of holding the additional volume that would result from the precipitation of a maximum twenty-five year storm of twenty-four hours duration. The containment system must:
 - (i) Have a base underlying the containers which is free of cracks or gaps and is sufficiently impervious to contain leaks, spills, and accumulated rainfall until the collected material is detected and removed. The base must be sloped or the containment system must be otherwise designed and operated to drain and remove liquids resulting from leaks, spills, or precipitation, unless the containers are elevated or are otherwise protected from contact with accumulated liquids;
 - (ii) Be designed for positive drainage control (such as a locked drainage valve) to prevent release of contaminated liquids and so that uncontaminated precipitation can be drained promptly for convenience of operation. Spilled or leaked waste and accumulated precipitation must be removed from the containment system in as timely a manner as is necessary to prevent overflow; and

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(iii) Have sufficient capacity to contain ten percent of the volume of all containers or the volume of the largest container, whichever is greater. Only containers holding free liquids, or holding wastes designated as F020, F021, F022, F023, F026, or F027 need to be considered in this determination.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(7)(b)

Run-on into the containment system must be prevented, unless the department waives this requirement in the permit after determining that the collection system has sufficient excess capacity in addition to that required in (a)(iii) of this subsection to accommodate any run-on which might enter the system.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(7)(c)

Storage areas that store containers holding only wastes that do not contain free liquids, do not exhibit either the characteristic of ignitability or reactivity as described in WAC 173-303-090 (5) or (7), and are not designated as F020, F021, F022, F023, F026, or F027, need not have a containment system as described in this subsection: Provided, That:

(i) The storage area is sloped or is otherwise designed and operated to drain and remove liquid resulting from precipitation; or

(ii) The containers are elevated or are otherwise protected from contact with accumulated liquids.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(7)(d)

The department may require generators to protect their containers from the elements by means of a building or other protective covering if the department determines that such protection is necessary to prevent a release of waste or waste constituents due to the nature of the waste or design of the container. The building or other protective covering must allow adequate inspection under subsection (6) of this section.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(8) and (8)(a)

Special requirements for ignitable or reactive waste.

(a) Containers holding reactive waste exhibiting a characteristic specified in WAC 173-303-090 (7)(a)(vi), (vii) or (viii) must be stored in a manner equivalent to the Uniform Fire Code's "American Table of Distances for Storage of Explosives," Table 77-201, 1979 edition or the version adopted by the local fire district.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(8)(b)

The owner or operator must design, operate, and maintain ignitable waste and reactive waste (other than a reactive waste which must meet (a) of this subsection) container storage in a manner

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equivalent with the Uniform Fire Code. Where no specific standard or requirements are specified in the Uniform Fire Code, or in existing state or local fire codes, applicable sections of the NFPA Pamphlet number 30, "Flammable and Combustible Liquids Code," must be used. The owner/operator must also comply with the requirements of WAC 173-303-395 (1)(d).

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(9) and (9)(a)

Special requirements for incompatible wastes.

(a) Incompatible wastes, or incompatible wastes and materials must not be placed in the same container, unless WAC 173-303-395 (1)(b) is complied with.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(9)(b)

Dangerous waste must not be placed in an unwashed container that previously held an incompatible waste or material.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(9)(c)

A storage container holding a dangerous waste that is incompatible with any waste or other materials stored nearby in other containers, piles, open tanks, or surface impoundments must be separated from the other materials or protected from them by means of a dike, berm, wall, or other device. Containment systems for incompatible wastes must be separate.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 630(10)

Closure. At closure, all dangerous waste and dangerous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soil containing or contaminated with dangerous waste or dangerous waste residues must be decontaminated or removed.

16.10.5 Asbestos Waste

REQUIREMENT SOURCE: 40 CFR 61, Dated 07-01-95, Part 150(a) Intro & (1)

(a) Discharge no visible emissions to the outside air during the collection, processing (including incineration), packaging, or transporting of any asbestos-containing waste material generated by the source, or use one of the emission control and waste treatment methods specified in paragraphs (a) (1) through (4) of this section.

(1) Adequately wet asbestos-containing waste material as follows:

(i) Mix control device asbestos waste to form a slurry; adequately wet other asbestos-containing waste material; and

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- (ii) Discharge no visible emissions to the outside air from collection, mixing, wetting, and handling operations, or use the methods specified by §61.152 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air; and
- (iii) After wetting, seal all asbestos-containing waste material in leak-tight containers while wet; or, for materials that will not fit into containers without additional breaking, put materials into leak-tight wrapping; and
- (iv) Label the containers or wrapped materials specified in paragraph (a)(1)(iii) of this section using warning labels specified by Occupational Safety and Health Standards of the Department of Labor, Occupational Safety and Health Administration (OSHA) under 29 CFR 1910.1001(j)(2) or 1926.58(k)(2)(iii). The labels shall be printed in letters of sufficient size and contrast so as to be readily visible and legible.
- (v) For asbestos-containing waste material to be transported off the facility site, label containers or wrapped materials with the name of the waste generator and the location at which the waste was generated.

REQUIREMENT SOURCE: 94-FDB-015, Dated 02-17-94, Section A

DISPOSAL:

Disposal of Regulated Asbestos-Containing Material shall be in accordance with 40 CFR 61.150 and this Agreement as more specifically set forth below for on-site disposal:

1. Asbestos containing waste shall be disposed of at the Hanford Site Central Landfill or other appropriate asbestos disposal facility, normally within five days of collection, unless handled as a dangerous waste in accordance with WAC 173-303 or as a radioactive material.
2. When it is determined to be impractical to dispose of asbestos waste within five (5) working days after collection for disposal, asbestos waste containers, while on the Hanford Site, shall be handled, transported, and disposed of in accordance with the following:
 - (a) Asbestos waste containers shall be accumulated in securable locations not accessible to the general public.
 - (b) Asbestos waste containers placed in an accumulation location shall be free of dangerous waste or radioactive contamination.
 - (c) Only employees authorized by RL and its contractors shall have access and use of asbestos waste accumulation locations.
 - (d) Access to accumulation locations shall be controlled at all times.

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(e) Containers not containing asbestos waste, if present at an accumulation location, will be segregated from the asbestos waste containers.

(f) Accumulation locations and the outer surface of asbestos waste containers shall be maintained free of uncontained asbestos waste.

REQUIREMENT SOURCE: 94-FDB-015, Dated 02-17-94, Section B

Notifications:

Notifications shall be in accordance with 40 CFR 61.145(b)(3)(ii) and 40 CFR 61.145(b)(3)(i),(iii), or (iv) and this Agreement as more specifically set forth below

1. Annual notification for projects under Regulation 1 thresholds will be submitted annually and the prescribed filing fee will be billed to the Westinghouse Hanford Company (WHC), or such other contractor as RL may direct by written notification.

2. Annual notification for asbestos projects between the Regulation 1 and NESHAP thresholds will also be reported annually and the filing fee as prescribed in Regulation 1 will also be billed to WHC, or such other contractor as RL may direct by written notification.

3. All other asbestos projects that exceed the NESHAP 260 liner feet and 160 square feet threshold will be reported to BFCCAA on a case by case basis and a separate filing fee will be billed to WHC, or such other contractor as RL may direct by written notification.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 395(3)

Asbestos dangerous waste disposal requirements. All asbestos containing waste material must be disposed of at waste disposal sites which are operated in accordance with 40 CFR Part 61 Subpart M. Such sites will not need to comply with any other standards of chapter 173-303 WAC, if they comply with 40 CFR Part 61.

16.10.6 Tank Systems

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(2) and (2)(a)

Assessment of existing tank system's integrity.

(a) For each existing tank system, the owner or operator must determine that the tank system is not leaking or is unfit for use. Except as provided in (b) of this subsection, the owner or operator must obtain and keep on file at the facility a written assessment reviewed and certified by an independent, qualified registered professional engineer, in accordance with WAC 173-303-810 (13)(a), that attests to the tank system's integrity by January 12, 1988, for underground tanks that do not meet the requirements of subsection (4) of this section and that cannot be entered for

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inspection, or by January 12, 1990, for all other tank systems.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(2)(e)

The owner or operator must develop a schedule for conducting integrity assessments over the life of the tank to ensure that the tank retains its structural integrity and will not collapse, rupture, or fail. The schedule must be based on the results of past integrity assessments, age of the tank system, materials of construction, characteristics of the waste, and any other relevant factors.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(4) and (4)(a)

Containment and detection of releases.

(a) In order to prevent the release of dangerous waste or dangerous constituents to the environment, secondary containment that meets the requirements of this subsection must be provided (except as provided in (f) and (g) of this subsection):

(i) For all new tank systems or components, prior to their being put into service;

(ii) For all existing tank systems used to store or treat Dangerous Waste Nos. F020, F021, F022, F023, F026, and F027, within two years after January 12, 1989;

(iii) For those existing tank systems of known and documented age, within two years after January 12, 1989, or when the tank system has reached fifteen years of age, whichever comes later;

(iv) For those existing tank systems for which the age cannot be documented, within eight years of January 12, 1989; but if the age of the facility is greater than seven years, secondary containment must be provided by the time the facility reaches fifteen years of age, or within two years of January 12, 1989, whichever comes later; and

(v) For tank systems that store or treat materials that become dangerous wastes subsequent to January 12, 1989, within the time intervals required in (a)(i) through (iv) of this subsection, except that the date that a material becomes a dangerous waste must be used in place of January 12, 1989.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(4)(b)

Secondary containment systems must be:

(i) Designed, installed, and operated to prevent any migration of wastes or accumulated liquid out of the system to the soil, ground water, or surface water at any time during the use of the tank system; and

(ii) Capable of detecting and collecting releases and accumulated liquids until the collected material is removed.

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REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(4)(c)

To meet the requirements of (b) of this subsection, secondary containment systems must be at a minimum:

- (i) Constructed of or lined with materials that are compatible with the waste(s) to be placed in the tank system and must have sufficient strength and thickness to prevent failure owing to pressure gradients (including static head and external hydrological forces), physical contact with the waste to which it is exposed, climatic conditions, and the stress of daily operations (including stresses from nearby vehicular traffic);
- (ii) Placed on a foundation or base capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift;
- (iii) Provided with a leak-detection system that is designed and operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of dangerous waste or accumulated liquid in the secondary containment system within twenty-four hours, or at the earliest practicable time if the owner or operator can demonstrate to the department that existing detection technologies or site conditions will not allow detection of a release within twenty-four hours; and
- (iv) Sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills, or precipitation. Spilled or leaked waste and accumulated precipitation must be removed from the secondary containment system within twenty-four hours, or in as timely a manner as is possible to prevent harm to human health and the environment, if the owner or operator can demonstrate to the department that removal of the released waste or accumulated precipitation cannot be accomplished within twenty-four hours.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(4)(d)

Secondary containment for tanks must include one or more of the following devices:

- (i) A liner (external to the tank);
- (ii) A vault;
- (iii) A double-walled tank; or
- (iv) An equivalent device as approved by the department.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(4)(e)

In addition to the requirements of (b), (c), and (d) of this subsection, secondary containment systems must satisfy the following requirements:

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(i) External liner systems must be:

(A) Designed or operated to contain one hundred percent of the capacity of the largest tank within its boundary;

(B) Designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a twenty-five-year, twenty-four-hour rainfall event.

(C) Free of cracks or gaps; and

(D) Designed and installed to surround the tank completely and to cover all surrounding earth likely to come into contact with the waste if the waste is released from the tank(s) (i.e., capable of preventing lateral as well as vertical migration of the waste).

(ii) Vault systems must be:

(A) Designed or operated to contain one hundred percent of the capacity of the largest tank within its boundary;

(B) Designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a twenty-five-year, twenty-four-hour rainfall event;

(C) Constructed with chemical-resistant water stops in place at all joints (if any);

(D) Provided with an impermeable interior coating or lining that is compatible with the stored waste and that will prevent migration of waste into the concrete;

(E) Provided with a means to protect against the formation of and ignition of vapors within the vault, if the waste being stored or treated:

(I) Meets the definition of ignitable waste under WAC 173-303-090(5); or

(II) Meets the definition of reactive waste under WAC 173-303-090(7), and may form an ignitable or explosive vapor.

(F) Provided with an exterior moisture barrier or be otherwise designed or operated to prevent migration of moisture into the vault if the vault is subject to hydraulic pressure.

(iii) Double-walled tanks must be:

(A) Designed as an integral structure (i.e., an inner tank completely enveloped within an outer

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shell) so that any release from the inner tank is contained by the outer shell;

(B) Protected, if constructed of metal, from both corrosion of the primary tank interior and of the external surface of the outer shell; and

(C) Provided with a built-in continuous leak detection system capable of detecting a release within twenty-four hours, or at the earliest practicable time, if the owner or operator can demonstrate to the department, and the department concludes, that the existing detection technology or site conditions would not allow detection of a release within twenty-four hours.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(4)(f)

Ancillary equipment must be provided with secondary containment (e.g., trench, jacketing, double-walled piping) that meets the requirements of (b) and (c) of this subsection except for:

(i) Aboveground piping (exclusive of flanges, joints, valves, and other connections) that are visually inspected for leaks on a daily basis;

(ii) Welded flanges, welded joints, and welded connections, that are visually inspected for leaks on a daily basis;

(iii) Sealless or magnetic coupling pumps and sealless valves, that are visually inspected for leaks on a daily basis; and

(iv) Pressurized aboveground piping systems with automatic shut-off devices (e.g., excess flow check valves, flow metering shutdown devices, loss of pressure actuated shut-off devices) that are visually inspected for leaks on a daily basis.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(5) and (5)(a)

General operating requirements.

(a) Dangerous wastes or treatment reagents must not be placed in a tank system if they could cause the tank, its ancillary equipment, or the containment system to rupture, leak, corrode, or otherwise fail.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(5)(b)

The owner or operator must use appropriate controls and practices to prevent spills and overflows from tank or containment systems. These include at a minimum:

(i) Spill prevention controls (e.g., check valves, dry disconnect couplings);

(ii) Overfill prevention controls (e.g., level sensing devices, high level alarms, automatic feed

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cutoff, or bypass to a standby tank); and

(iii) Maintenance of sufficient freeboard in uncovered tanks to prevent overtopping by wave or wind action or by precipitation.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(5)(c)

The owner or operator must comply with the requirements of subsection (7) of this section if a leak or spill occurs in the tank system.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(5)(d)

All tank systems holding dangerous waste must be marked with labels or signs to identify the waste contained in the tank. The label or sign must be legible at a distance of at least fifty feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the tank system(s). (Note--If there already is a system in use that performs this function in accordance with local, state or federal regulations, then such system will be adequate.)

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(6) and (6)(a)

Inspections.

(a) The owner or operator must develop and follow a schedule and procedure for inspecting overflow controls.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(6)(b)

The owner or operator must inspect at least once each operating day:

(i) Aboveground portions of the tank system, if any, to detect corrosion or releases of waste;

(ii) Data gathered from monitoring any leak detection equipment (e.g., pressure or temperature gauges, monitoring wells) to ensure that the tank system is being operated according to its design; and

(iii) The construction materials and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system (e.g., dikes) to detect erosion or signs of releases of dangerous waste (e.g., wet spots, dead vegetation).

Note: WAC 173-303-320 requires the owner or operator to remedy any deterioration or malfunction he finds. Subsection (7) of this section requires the owner or operator to notify the department within twenty-four hours of confirming a leak. Also, 40 CFR Part 302 may require the owner or operator to notify the National Response Center of a release.

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REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(6)(c)

The owner or operator must inspect cathodic protection systems, if present, according to, at a minimum, the following schedule to ensure that they are functioning properly:

- (i) The proper operation of the cathodic protection system must be confirmed within six months after initial installation and annually thereafter; and
- (ii) All sources of impressed current must be inspected and/or tested, as appropriate, at least bimonthly (i.e., every other month).

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(6)(d)

The owner or operator must document in the operating record of the facility an inspection of those items in (a) through (c) of this subsection. The owner or operator must keep an inspection log including at least the date and time of the inspection, the printed name and the handwritten signature of the inspector, a notation of the observations made and the date and nature of any repairs or remedial actions taken. The log must be kept at the facility for at least five years from the date of inspection.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(7) and (7)(a)

Response to leaks or spills and disposition of leaking or unfit-for-use tank systems.

A tank system or secondary containment system from which there has been a leak or spill, or which is unfit for use, must be removed from service immediately, and the owner or operator must satisfy the following requirements:

- (a) Cessation of use; prevent flow or addition of wastes. The owner or operator must immediately stop the flow of dangerous waste into the tank system or secondary containment system and inspect the system to determine the cause of the release.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(7)(b)

Removal of waste from tank system or secondary containment system.

- (i) If the release was from the tank system, the owner/operator must, within twenty-four hours after detection of the leak or, if the owner/operator demonstrates that it is not possible, at the earliest practicable time, remove as much of the waste as is necessary to prevent further release of dangerous waste to the environment and to allow inspection and repair of the tank system to be performed.
- (ii) If the material released was to a secondary containment system, all released materials must be

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removed within twenty-four hours or in as timely a manner as is possible to prevent harm to human health and the environment.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(7)(c)

Containment of visible releases to the environment. The owner/operator must immediately conduct a visual inspection of the release and, based upon that inspection:

- (i) Prevent further migration of the leak or spill to soils or surface water; and
- (ii) Remove, and properly dispose of, any visible contamination of the soil or surface water.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(7)(d) and (7)(d)(i)

Notifications, reports.

- (i) Any release to the environment, except as provided in (d)(ii) of this subsection, must be reported to the department within twenty-four hours of its detection. Any release above the "reportable quantity" must also be reported to the National Response Center pursuant to 40 CFR Part 302.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(7)(d)(ii)

A leak or spill of dangerous waste is exempted from the requirements of (d) of this subsection if it is:

- (A) Less than or equal to a quantity of one pound, or the "Reportable Quantity" (RQ) established in 40 CFR Part 302, whichever is less; and
- (B) Immediately contained and cleaned-up.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(7)(d)(iii)

Within thirty days of detection of a release to the environment, a report containing the following information must be submitted to the department:

- (A) Likely route of migration of the release;
- (B) Characteristics of the surrounding soil (soil composition, geology, hydrogeology, climate);
- (C) Results of any monitoring or sampling conducted in connection with the release (if available). If sampling or monitoring data relating to the release are not available within thirty days, these data must be submitted to the department as soon as they become available;

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(D) Proximity to downgradient drinking water, surface water, and populated areas; and

(E) Description of response actions taken or planned.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(7)(e) and (7)(e)(i)

Provision of secondary containment, repair, or closure.

(i) Unless the owner/operator satisfies the requirements of (e)(ii) through (iv) of this subsection, the tank system must be closed in accordance with subsection (8) of this section.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(7)(e)(ii)

If the cause of the release was a spill that has not damaged the integrity of the system, the owner/operator may return the system to service as soon as the released waste is removed and repairs, if necessary, are made.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(7)(e)(iii)

If the cause of the release was a leak from the primary tank system into the secondary containment system, the system must be repaired prior to returning the tank system to service.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(7)(e)(iv)

If the source of the release was a leak to the environment from a component of a tank system without secondary containment, the owner/operator must provide the component of the system from which the leak occurred with secondary containment that satisfies the requirements of subsection (4) of this section before it can be returned to service, unless the source of the leak is an aboveground portion of a tank system that can be inspected visually. If the source is an aboveground component that can be inspected visually, the component must be repaired and may be returned to service without secondary containment as long as the requirements of (f) of this subsection are satisfied. If a component is replaced to comply with the requirements of this subitem, that component must satisfy the requirements for new tank systems or components in subsections (3) and (4) of this section. Additionally, if a leak has occurred in any portion of a tank system component that is not readily accessible for visual inspection (e.g., the bottom of an inground or onground tank), the entire component must be provided with secondary containment in accordance with subsection (4) of this section prior to being returned to use.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(7)(f)

Certification of major repairs. If the owner/operator has repaired a tank system in accordance with (e) of this subsection, and the repair has been extensive (e.g., installation of an internal liner; repair of a ruptured primary containment or secondary containment vessel), the tank system must not be returned to service unless the owner/operator has obtained a certification by an independent,

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qualified, registered, professional engineer in accordance with WAC 173-303-810 (13)(a) that the repaired system is capable of handling dangerous wastes without release for the intended life of the system. This certification must be submitted to the department within seven days after returning the tank system to use.

Note: See WAC 173-303-320 for the requirements necessary to remedy a failure. Also, 40 CFR Part 302 may require the owner or operator to notify the National Response Center of certain releases.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(8) and (8)(a)

Closure and post-closure care.

(a) At closure of a tank system, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated soils, and structures and equipment contaminated with waste, and manage them as dangerous waste, unless WAC 173-303-070 (2)(a) applies. The closure plan, closure activities, cost estimates for closure, and financial responsibility for tank systems must meet all of the requirements specified in WAC 173-303-610 and 173-303-620.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(8)(b)

If the owner or operator demonstrates that not all contaminated soils can be practicably removed or decontaminated as required in (a) of this subsection, then the owner or operator must close the tank system and perform post-closure care in accordance with the closure and post-closure care requirements that apply to landfills (see WAC 173-303-665(6)). In addition, for the purposes of closure, post-closure, and financial responsibility, such a tank system is then considered to be a landfill, and the owner or operator must meet all of the requirements for landfills specified in WAC 173-303-610 and 173-303-620.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(8)(c)

If an owner or operator has a tank system that does not have secondary containment that meets the requirements of subsection (4)(b) through (f) of this section and is not exempt from the secondary containment requirements in accordance with subsection (4)(g) of this section, then:

- (i) The closure plan for the tank system must include both a plan for complying with (a) of this subsection and a contingent plan for complying with (b) of this subsection.
- (ii) A contingent post-closure plan for complying with (b) of this subsection must be prepared and submitted as part of the permit application.
- (iii) The cost estimates calculated for closure and post-closure care must reflect the costs of complying with the contingent closure plan and the contingent post-closure plan, if those costs are

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greater than the costs of complying with the closure plan prepared for the expected closure under (a) of this subsection.

(iv) Financial assurance must be based on the cost estimates in (c)(iii) of this subsection.

(v) For the purposes of the contingent closure and post-closure plans, such a tank system is considered to be a landfill, and the contingent plans must meet all of the closure, post-closure, and financial responsibility requirements for landfills under this chapter (WAC 173-303-610 and 173-303-620).

16.11 Key Interfaces

16.11.1 Environmental Protection

The Environmental Protection Functional Area develops and implements programs that direct the WM Program and provides oversight, confirmation, and independent verification of an ongoing WM Program. Specific environmental programmatic interfaces for the WM Program should include the following:

a. A process which ensures programs are in place requiring monitoring, surveillance, and inspection and are designed to prevent, detect, and mitigate leaks, spills, uncontrolled effluent discharges.

b. A process that ensures the appropriate identification of necessary environmental permits, permit application processes, permit contents, permit modification, permit tracking systems, and closure.

c. A process in which facilities must observe to comply with environmental protection laws and regulations.

d. A process which addresses the development of an environmental database that defines a reference point against which all future activities may be measured.

16.11.2 Emergency Management

The Emergency Management Functional Area addresses the centralized management within WM regarding emergency planning, preparedness, and response activities. These functions are segregated into the Transportation Emergency Preparedness Program, and the site Emergency Preparedness Program.

16.11.3 Safeguards and Security

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The Safeguards and Security Functional Area is responsible for implementing the WAC requirements for dangerous waste security to ensure that unauthorized personnel may not unknowingly enter TSD facilities.

16.11.4 Engineering Program

The WM Functional Area interfaces with the Engineering Program Functional Area in that the engineering program must have organizational interaction with state or federal regulators in the design requirements for permitted waste facilities. In addition, changes to waste operations and modification of processes may require regulatory approval.

16.11.5 Fire Protection

The Fire Protection Functional Area interfaces with the WM Functional Area in that the Fire Protection Functional Area includes administrative control of hazardous substances or processes, inspection, maintenance, and testing of fire protection features and for other relevant fire protection activities. Waste generation, accumulation, storage, treatment, and disposal facilities would need to be included in the program establishing such hazard controls.

16.11.6 Packaging and Transportation

The Packaging and Transportation Functional Area addresses and ensures all hazardous materials (particularly radioactive), substances, and waste, can be efficiently, economically, safely, and legally packaged and transported. The Packaging and Transportation Functional Area maintains the responsibility with any waste packaging and transport of materials from the areas within the site boundary.

16.11.7 Occupational Safety and Health

The OS&H Functional Area addresses broad DOE safety and health goals and objectives and incorporates them into site-specific Fluor Daniel Hanford Company procedures and requirements. The WM Program must rely on the OS&H Functional Area for establishing the health and safety controls required to perform WM functions. Specifically, the OS&H Functional Area provides implementation procedures to control hazardous or toxic materials; physical hazards; hazards identification, surveillance, and communication; asbestos removal operation; hazardous materials handling and emergency response; posting of danger signs and tags or safety instructional materials; storage of pressurized gases; lockout and tagout activities; and explosive or combustible materials handling, processing, storage, transportation, and shipping. The WM Program should integrate the OS&H

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Functional Area into its Program which identifies the basic policy, responsibilities, authorities, program requirements, and implementation criteria.

16.11.8 Quality Assurance

The Quality Assurance Functional Area and its requirements apply to all items, activities, and processes managed by the WM Program. The Quality Assurance Functional Area is integrated into the WM Program with three fundamental categories: management, performance, and assessment. The integration of these categories should be included in the WM Program procedures.

16.11.9 Radiation Protection

The Radiological Protection Functional Area addresses the radiological safety of FDH employees, Hanford personnel, the public, and the environment during all WM activities.

16.11.10 Training and Qualification

The Training and Qualification Functional Area is integrated into the WM Program by defining the appropriate personnel selection, training, qualifications, and resources necessary to safely and efficiently perform WM activities.

16.11.11 Management Systems

The Management Systems Functional Area specifies requirements for compliance management that are applicable to implementing the WM requirements specified in this document.

16.12 References

16.12.1 Requirement Source Documents

See the attached "RIDS by Document X-Reference Listing" for the documents used as requirements sources in the development of this Functional Area.

16.12.2 Reviewed Documents Not Used as Requirement Sources

The following reference documents were reviewed, but were not cited:

40 CFR 262, Standards Applicable to Generators of Hazardous Waste, as amended by 58 FR 34370, 06/25/93

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40 CFR 279, Standards for the Management of Used Oil, as amended by 59 FR 10559, 03/04/94

42 USC 6924, Resource Conservation and Recovery Act of 1976, 10/24/92

DOE 5400.1, General Environmental Protection Program, effective 06/29/90

WAC-173-304, Minimum Function Standards for Solid Waste Handling, effective 11/05/88

WAC-296-65, Asbestos Removal and Encapsulation, effective 01/01/92

Washington State Register Issue 94-12, dated 06/15/94

RIDs by Document X-Reference Listing
Based on 324-WM-SD RID and including all documents.

40 CFR 61, National Emission Standards for Hazardous Air Pollutants, Dated 07-01-95

40 CFR 268, Land Disposal Restrictions, Dated 07-01-95

94-FDB-015, Agreement Relating to Removal and Encapsulation of Asbestos Material, Dated 02-17-94

DOE ORDER 5820.2A, Radioactive Waste Management

TRIPARTY AGREEMENT, Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement), Revision 6

WAC 173-303, Dangerous Waste Regulations, Dated 11-01-95

WAC 173-307, Plans, Dated 05-02-91

***** End of RIDs by Document X-Reference Listing *****

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17.0 Research and Development and Experimental Activities

A Standards/Requirements Identification Document (S/RID) is the total list of the environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be

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moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

JUSTIFICATION FOR FUNCTIONAL AREA NONDUPLICATION OF REQUIREMENTS

Requirements that are unique to the R&D functional area relate to budgets, schedules and other such project management activities. Only requirements that have a direct bearing on the environment, or the safety and health of the workers, or the public have been utilized in FDH S/RID documents prepared by the FDH QA S/RIDs Coordination Organization to date. Any requirements relevant to R&D projects, excluding project management activities, are not unique to R&D and are covered in the other functional areas. These requirements will not be duplicated here.

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18.0 Nuclear Safety

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract level S/RID.

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For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

The Nuclear Safety Program described in this Standards/Requirements Identification Document (S/RID) includes program elements that are necessary to assure that nuclear operations at Department of Energy (DOE) facilities are conducted safely, effectively, and in accordance with specified DOE requirements and selected industry codes, standards, and guidelines. The primary sources of requirements for this Nuclear Safety Program S/RID are DOE Orders 5480.21, 5480.22, 5480.23, and 5480.24.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

18.1 Program Management

Requirements for this section are found in the Management Systems Functional Area (Chapter 1).

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18.1.1 Training and Qualification

Requirements for this section are found in Management Systems and Training and Qualifications Functional Area.

18.1.2 Self-Assessment Process

Requirements for this section are found in the Quality Assurance Functional Area.

18.1.3 Documentation

Requirements for this section are found in the Management Systems, Configuration Management, and Quality Assurance Functional Areas and in subelement 18.3 of this functional area.

18.2 Safety Reviews

Requirements for this section are found in the FDH Contract level Quality Assurance Functional Area and Management Systems Functional Area, subelement 18.3.

18.2.1 Independent Peer Review

Independent Peer Review requirements are addressed in the FDH Contract level Quality Assurance Functional Area, subelement 2.11.

18.2.2 Operations Review

Requirements of Operations review are covered in the Management Systems Functional Area, subelement 1.7.

18.2.3 Safety Oversight Review

The requirements of Safety Oversight review are covered in the FDH Contract level Quality Assurance Functional Area, subelement 2.11, Independent Assessments.

18.3 Safety Analysis

Author's Note: The 324 Building Safety Analysis Report (PNL-SAR-324) and Building Operating Limits (PNL-LIM-324) are approved as the authorization basis for operation of the 324 Building. These documents do not meet the criteria for a 5480.23 SAR.

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Acceptance criteria for a technical upgrade to the existing SAR will be prepared by mid 1997.

REQUIREMENT SOURCE: DOE ORDER 5480.23, Revision C01, Section 8

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. 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. All contractors shall be held responsible for adhering to assumptions and commitments set forth in the safety analysis. 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. 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. Attachment I provides guidance in greater detail than the requirements of this Order.

REQUIREMENT SOURCE: DOE ORDER 5480.23, Revision C01, Section 8.a.(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. The level of analysis and documentation for each facility must be commensurate with:

- (a) The magnitude of the hazards being addressed;
- (b) The complexity of the facility and/or systems being relied on to maintain an acceptable level of risk; and
- (c) The stage or stages of the facility life cycle for which DOE approval is sought.

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.c. Paragraph 1

Nuclear criticality safety programs shall be fully documented. 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.

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.c. Paragraph 2, Sentence 1 and 2

Author's Note: The 324 facility will not develop TSRs before closure. The current facility SAR and OSRs address criticality safety.

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The basis for criticality safety shall be included in the facility SAR. Additionally, the limiting conditions of operation for criticality safety shall be included in the facility TSRs.

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.c.(1)

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.

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.c.(2)

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.

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.c.(3)

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.

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.c.(4)

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.

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.c.(5)

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.

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.c.(6)

A description of the safety control parameters which are intended to prevent criticality resulting from such events 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.

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.c.(7)

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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.

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.c.(8)

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. The measurement control program shall be in accordance with the latest edition of DOE 5700.6C, "QUALITY ASSURANCE."

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.c.(9)

An analysis of the spacing of masses of fissionable material within each process area and separation from fissionable material in adjoining areas.

18.3.1 Safety Analysis Report

Author's Note: The 324 Building Safety Analysis Report (PNL-SAR-324) and Building Operating Limits (PNL-LIM-324) are approved as the authorization basis for operation of the 324 Building. These documents do not meet the criteria for a 5480.23 SAR. Acceptance criteria for a technical upgrade to the existing SAR will be prepared by mid 1997.

REQUIREMENT SOURCE: DOE ORDER 5480.23, Revision C01, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5480.23, Revision C01, Section 8.b.(2)

Each SAR required by this Order shall include thorough documentation of the assumptions employed in the safety analysis.

REQUIREMENT SOURCE: DOE ORDER 5480.23, Revision C01, Section 8.b.(3)

Author's Note: Author's Note: The 324 Building Safety Analysis Report (PNL-SAR-324) and Building Operating Limits (PNL-LIM-324) are approved as the authorization basis for operation of the 324 Building. These documents do not meet the criteria for a 5480.23 SAR. Acceptance criteria for a technical upgrade to the existing SAR will be prepared by mid 1997.

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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. The safety analysis report shall address the following topics:

- (a) Executive summary;
- (b) Applicable statutes, rules, regulations and Departmental Orders;
- (c) Site characteristics;
- (d) Facility description and operation, including design of principal structures, components, all systems, engineered safety features, and processes;
- (e) Hazard analysis and classification of the facility;
- (f) Principal health and safety criteria;
- (g) Radioactive and hazardous material waste management;
- (h) Inadvertent criticality protection;
- (i) Radiation protection;
- (j) Hazardous material protection;
- (k) 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.
- (l) Management, organization, and institutional safety provisions;
- (m) Procedures and training;
- (n) Human factors;
- (o) Initial testing, inservice surveillance, and maintenance;
- (p) Derivation of TSRs;
- (q) Operational safety;

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- (r) Quality assurance;
- (s) Emergency preparedness;
- (t) Provisions for decontamination and decommissioning; and
- (u) Applicable Facility design codes and standards.

REQUIREMENT SOURCE: DOE ORDER 5480.23, Revision C01, Section 9.a.(2)

Contractors shall be required to submit Final Safety Analysis Reports (FSARs) to the PSO for approval and authorization to operate DOE nuclear facilities. 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.

REQUIREMENT SOURCE: DOE ORDER 5480.23, Revision C01, Section 9.b.(1), Sentences 1 and 2

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. 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.

REQUIREMENT SOURCE: DOE ORDER 5480.23, Revision C01, Section 9.b.(2)

Plan and Schedule for Safety Analysis Reports. 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. 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. Once a submitted plan and schedule is approved by DOE, the contractor shall comply with the plan and schedule, including any DOE modifications. 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. Approved plans and schedules may be changed, but such changes must be approved in the same manner as initial plans and schedules.

REQUIREMENT SOURCE: DOE ORDER 5480.23, Revision C01, Section 9.c., Sentences 1 thru 3

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Periodic Updates of Safety Analysis Reports. 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.

18.3.2 Hazard Classification

Author's Note: DOE-STD-1027-92 will be used to implement hazard classification requirements from DOE 5480.23.

REQUIREMENT SOURCE: DOE ORDER 5480.23, Revision C01, Section 8.c.(1)

Classification Categories. The consequences of unmitigated releases of radioactive and/or hazardous material shall be evaluated and classified by the following hazard categories:

- (a) Category 1 Hazard. The hazard analysis shows the potential for significant offsite consequences.
- (b) Category 2 Hazard. The hazard analysis shows the potential for significant onsite consequences.
- (c) Category 3 Hazard. The hazard analysis shows the potential for only significant localized consequences.

REQUIREMENT SOURCE: DOE ORDER 5480.23, Revision C01, Section 8.c.(2)

Inventory of Hazardous Materials. 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.

REQUIREMENT SOURCE: DOE ORDER 5480.23, Revision C01, Section 8.c.(3)

Evaluation of Potential Releases. The hazard analysis shall identify energy sources or processes that might contribute to the generation or uncontrolled release of hazardous materials. 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.

18.4 Technical Safety Requirements

Author's Note: The 324 Building Safety Analysis Report (PNL-SAR-324) and Building Operating Limits (PNL-LIM-324) are approved as the authorization basis for operation of the 324 Building. DOE approved Operational Safety Requirements (OSRs) provide

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adequate controls but do not meet the form and content of 5480.22, Technical Safety Requirements. Acceptance criteria for a technical upgrade to the existing OSRs will be prepared by mid 1997. For purposes of implementation, the following requirements will apply to the approved OSRs.

REQUIREMENT SOURCE: DOE ORDER 5480.22, Revision C01, Section 9.a

A contractor responsible for the operation of a DOE nuclear facility shall:

- (1) prepare Technical Safety Requirements for the facility;
- (2) submit the Technical Safety Requirements to the PSO for approval; and
- (3) operate the facility in accordance with the Technical Safety Requirements as approved by the PSO including any modification by the PSO;

REQUIREMENT SOURCE: DOE ORDER 5480.22, Revision C01, Section 9.c

The TSR and its appendices constitute an agreement or contract between DOE and the facility operating management regarding the safe operation of the facility. As such, they cannot be changed without PSO approval.

REQUIREMENT SOURCE: DOE ORDER 5480.22, Revision C01, Section 9.f

The TSR 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. 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. The TSR must be approved prior to facility or facility practice change. To assure that the TSR is current, it shall be reviewed at least annually along with the facility Safety Analysis Report.

REQUIREMENT SOURCE: DOE ORDER 5480.22, Revision C01, Section 9.g

All proposed revisions to Technical Safety Requirements or its Appendices shall be submitted for PSO approval. Such submittals shall include the basis for the proposed revision. Revision implementation shall occur only after PSO approval.

REQUIREMENT SOURCE: DOE ORDER 5480.22, Revision C01, Section 9.h

Only the current PSO-approved Technical Safety Requirements shall be used for the operation of the facility. The current PSO-approved Technical Safety Requirements shall be a controlled document.

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REQUIREMENT SOURCE: DOE ORDER 5480.22, Revision C01, Section 9.i

A contractor may take emergency actions that depart from the approved Technical Safety Requirements when no actions consistent with the Technical Safety Requirements are immediately apparent, and when these actions are needed to protect the public health and safety. Such contractor actions shall be approved, as a minimum, by a certified operator or supervisor certified on that system through an accredited training program. 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.

18.5 Unreviewed Safety Questions

REQUIREMENT SOURCE: DOE ORDER 5480.21, Chapter III, Section 5.a

Contractors are required to develop procedures that provide detailed guidance for the performance and review of USQ determinations. At a minimum, the procedures shall define the purpose of the procedure; set forth the procedure's 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.

REQUIREMENT SOURCE: DOE ORDER 5480.21, Preamble, Section 10.a

A contractor authorized to operate DOE nuclear facilities shall:

- (1) Perform all safety evaluations required by paragraph (b) of this section to determine whether a situation involves USQ;
- (2) Prior to implementation of a proposed action, obtain PSO approval for situations determined to involve a USQ or a Technical Safety Requirements (TSR) change; and
- (3) Develop and implement procedures to govern the need for, and the performance of, safety evaluations under this section.

REQUIREMENT SOURCE: DOE ORDER 5480.21, Preamble, Section 10.b

A safety evaluation shall be performed for:

- (1) Temporary or permanent changes in the facility as described in the existing safety analyses;

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- (2) Temporary or permanent changes in the procedures as described in existing safety analyses; or
- (3) Test or experiments not described in existing safety analyses.

REQUIREMENT SOURCE: DOE ORDER 5480.21, Preamble, Section 10.c

A situation involves a USQ if:

- (1) 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;
- (2) The possibility for an accident or malfunction of a different type than any evaluated previously in the facility safety analyses could be created; or
- (3) Any margin of safety, as defined in the bases of the TSRs, could be reduced.

REQUIREMENT SOURCE: DOE ORDER 5480.21, Preamble, Section 10.d

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:

- (1) Notify the PSO of the situation upon discovery of the information;
- (2) Make an evaluation in accordance with paragraphs 10a and 10c;
- (3) Take action to place the facility in a safe condition until the safety evaluation is completed; and
- (4) Submit the completed safety evaluation prior to removing any operational restrictions initiated pursuant to paragraph 10d(2).

REQUIREMENT SOURCE: DOE ORDER 5480.21, Preamble, Section 10.e

For all safety evaluations required under this section, a contractor shall:

- (1) 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;
- (2) 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;
- (3) Incorporate in the existing SAR, any changes that are needed as a result of the safety

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evaluation or any action taken; and

(4) 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.

18.6 Nuclear Criticality Safety

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.a. Introduction

Author's Note: ANS-8.5 and ANS-8.15 are not applicable to the 324 Building.

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.

ANS-8.3, "Criticality Accident Alarm System," except paragraphs 4.2 and 4.2.2.

ANS-8.5, "Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Material."

ANS-8.15, "Nuclear Criticality Control of Special Actinide Elements."

ANS-8.19, "Administrative Practices for Nuclear Criticality Safety."

ANS-8.7, "Guide for Nuclear Criticality Safety in the Storage of Fissile Materials."

18.6.1 Criticality Safety Design Practices

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.a.(2)(a)

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.

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REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.a.(2)(b)

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. 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. The basis for not selecting geometry control shall be fully documented.

**REQUIREMENT SOURCE: DOE ORDER 6430.1A, Division 13, Section 1300- 4[05],
Sentence 1**

Structures, systems, and components that provide nuclear criticality safety shall be designed as safety class systems and be capable of performing their criticality safety functions during and following design basis accidents and events.

18.6.2 Materials Control

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.d

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.

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.e.(1)

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.

REQUIREMENT SOURCE: DOE ORDER 5480.24, Section 7.f.(1)

Contractors shall establish guidelines for permitting fire fighting water or other moderating materials used to suppress fires within or adjacent to moderation controlled areas. 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). The basis for the guidelines shall be fully documented in a DOE approved Safety Analysis.

18.7 Key Interfaces

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All facility activities are governed by the contract wide nuclear safety program. Specific functional areas must implement the programs/requirements developed in the nuclear safety program.

The interfaces between nuclear safety and other functional areas within the 324 Building are as follows:

18.7.1 Management Systems

Program management systems provides the general aspects of management, policy, staffing, training, and self assessment required to run a nuclear facility. Nuclear safety interacts with program management to determine what programs can be developed to give assurance that nuclear safety is maintained.

18.7.2 Quality Assurance

QA develops the QA program that provides the requirements to be applied to activities important to nuclear safety and quality as described in the facility QA Plan. QA also provides for the performance of audits and surveillances of nuclear safety activities plus quality control inspections to be performed by the QA organization.

18.7.3 Configuration Management

Configuration Management uses input from the nuclear safety program on which to base the configuration control program for future modifications.

18.7.4 Training and Qualification

Training and Qualification establishes the procedures and requirements that control the training and/or selection of certain technical personnel. Training and Qualification develops training curriculum and keeps records for training on nuclear safety requirements.

18.7.5 Emergency Management

Nuclear safety information is supplied to Emergency Planning (EP) and Preparedness for the design of programs and plans. This information will deal with the potential for accidental criticality and the results of the potential accident.

18.7.6 Safeguards and Security

The Safeguards and Security Functional Area addresses acts of sabotage and other

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malevolent acts involving the control and accountability of special nuclear material and nuclear facilities and operations. Safeguards and security information should not be addressed in SARs or other publicly available documents to ensure facility security.

18.7.7 Engineering Program

Engineering incorporates nuclear safety requirements into design and design modifications. They also develop and update the SAR per nuclear safety requirements to identify additional engineering nuclear safety features, and to ensure that current safety features are not affected by modifications.

18.7.8 Operations

The Operations Functional Area interfaces and provides nuclear safety input in areas of operations that may be different from the safety analysis basis for determination of any possible USQs. This interface is needed to ensure that nuclear safety principles are incorporated into daily operations.

18.7.9 Maintenance

Nuclear safety input is received from Maintenance activities if systems/ equipment do not perform per design and determines if there is a safety impact of these problem areas. This interface is also necessary to assure that maintenance personnel are familiar with areas containing material with the potential for accidental criticality events, and to assure that engineered safety systems receive the proper maintenance.

18.7.10 Radiation Protection

An interface between nuclear safety Functional Area and the RP Functional Areas is necessary to ensure that radiation protection standards are incorporated into the nuclear safety program.

18.7.11 Packaging and Transportation

Physical management of special nuclear materials requires an interface to the Packaging and Transportation Functional Area to ensure proper labelling, packaging, and transportation of those materials.

18.7.12 Research and Development and Experimental Activities

Operations and Radiation Protection interface with the R and D functional area to ensure

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safe operating practices and ALARA are maintained.

18.7.13 Fire Protection

Fire Protection requirements and system information are described in the SAR. This interface is necessary to assure that fire fighting activities do not create the potential for criticality.

18.7.14 Occupational Safety and Health

OS&H provides information regarding health related areas for inclusion in and modification to the SAR.

18.7.15 Environmental Protection

Environmental Protection periodic monitoring programs supply information to confirm the assumptions of the SAR. If there are any deviations from expected results, an investigation will determine the cause and a course of corrective action.

18.8 References

18.8.1 Requirement Source Documents

For references, see attached report titled "RIDs by Document X-Reference Listing".

18.8.2 Reviewed Documents Not Used as Requirement Sources

10 CFR 820, Procedural Rules for Nuclear Activities, Final Rule, Federal Register, Vol. 58, No. 157, Tuesday, August 17, 1993, Rules and Regulations.

10 CFR 830, Nuclear Safety Management, Final Rule, Federal Register, Vol. 59, No. 65, Tuesday, 4/5/94.

RL 5480.1A, Environment, Safety, and Health Program for Department of Energy Operations, 10/31/83.

DOE 5480.1B, Environmental Safety and Health Program for Departmental of Energy Operation, 9/23/86.

DOE-RL 5480.1, Safety of Department of Energy Owned Reactors, 6/24/82.

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DOE 5480.4, Environmental Protection, Safety, Health Protection Standards, 1/7/93.

RLIP 5480.4C, Environmental Protection, Safety, and Health Protection Standards for RL, 11/6/92.

DOE 5480.5, Safety of Nuclear Facilities, 10/15/84.

DOE 5480.7A, Fire Protection, 2/17/93.

DOE 5480.10, Contractor Industrial Hygiene Program, 6/26/85.

DOE 5480.28, Natural Phenomena Hazards Mitigation, 1/15/93.

DOE 5480.30, Nuclear Reactor Safety Design Criteria, 1/19/93.

DOE 5482.1B, Environment, Safety and Health Appraisal Program, 11/18/91.

RL 5481.1, Safety Analysis and Review System, 10/5/83.

DOE-RL-5482.1B, Environment, Safety, Health, and Quality Assurance Appraisal and Surveillance Program, 3/4/87.

DOE-SEN-35-91, Nuclear Safety Policy, 9/9/91.

DOE-STD-1027-92, Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports, 12/1/92.

ANSI/ANS-8.1-1993, Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors.

ANSI/ANS-8.7-1984, Administrative Practices for Nuclear Criticality Safety.

ANSI/ANS-8.20-1991, Nuclear Criticality Safety Training.

ANSI N16.5-1975 (ANS-8.7), American National Standard Guide for Nuclear Criticality Safety in the Storage of Fissile Materials.

RIDs by Document X-Reference Listing
Based on 324-NS-SD RID and including all documents.

DOE ORDER 5480.21, Unreviewed Safety Questions

DOE ORDER 5480.22, Technical Safety Requirements, Revision C01

DOE ORDER 5480.23, Nuclear Safety Analysis Reports, Revision C01

DOE ORDER 5480.24, Nuclear Criticality Safety

DOE ORDER 6430.1A, General Design Criteria

*** End of RIDs by Document X-Reference Listing ***

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19.0 Occupational Safety and Health

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract level S/RID.

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For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

The principle governing requirements for an Occupational Safety and Health Program are contained in 29 CFR 1910 and 29 CFR 1926. The 324 facility is a general industry facility that has modifications ongoing by outside contractors, however, construction is not an integral part of 324 operations or their current and future mission, therefore 29 CFR 1926 (OSHA Construction) is not currently applicable to the 324 facility.

The OS&H Program defined in this document is presented in the form of program elements and subelements. The elements used to outline the basis of a comprehensive OS&H Program are as follows:

- Program Management
- Hazard Anticipation, Identification, and Evaluation
- OS&H Hazard Prevention and Control
- Recordkeeping and Recording
- Key Program Interfaces
- References

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy

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Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

19.1 Management and Administration

19.1.1 Program Policy

Specific controls which govern the preparation and implementation of program policies are addressed in the Policies and Procedures section of the Management Systems Functional Area.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.a(1)

The Operating Organization having line safety and health responsibilities should be required to: (a) conduct operation consistent with established health and safety procedures; (b) include the industrial hygiene staff in the design review process whenever new construction or remodeling of an existing process is planned; and (c) request the industrial hygiene staff to evaluate the effectiveness of proposed environmental control equipment and approve procedures for its use.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.a(5)

Employees should be required to:

- (a) observe all safety and health rules;
- (b) use all prescribed personal protective equipment;
- (c) follow established health and safety practices and procedures; and
- (d) notify supervisors immediately of suspected exposures to harmful agents or conditions.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.c(4)(a)

Safety plans, standard operating procedures, or experimental protocols shall be written describing the use of chemical carcinogens and the procedures used to control exposure. These documents shall be reviewed and approved by the industrial hygiene staff prior to the initiation of an operation.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 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

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implement the industrial hygiene program set forth in this Order.

REQUIREMENT SOURCE: DOE ORDER 5483.1A, Chapter I, Section 1

Author's Note: The 324 facility is a general industry facility that has modifications ongoing by outside contractors, however, construction is not an integral part of the 324 operations or their current or future mission. Therefore, 29 CFR 1926 is not routinely applicable to the 324 facility.

Title 29 CFR Part 1915, "Occupational Safety and Health Standards for Shipyard Employees," Title 29 CFR Part 1918, "Safety and Health Regulations for Longshoring," and Title 29 CFR 1928, "Occupational Safety and Health Standards for Agriculture," are also not applicable to the 324 facility.

DOE Prescribed OSHA Standards. As applicable to their work in GOCO facilities, contractors shall comply with the following DOE-prescribed OSHA standards:

- a. "Occupational Safety and Health Standards," Title 29 CFR Part 1910.
- b. "Safety and Health Regulations for Construction," Title 29 CFR Part 1926.
- c. "Occupational Safety and Health Standards for Shipyard Employees," Title 29 CFR Part 1915.
- d. "Safety and Health Regulations for Longshoring," Title 29 CFR Part 1918.
- e. "Occupational Safety and Health Standards for Agriculture," Title 29 CFR Part 1928.

REQUIREMENT SOURCE: DOE ORDER 5483.1A, Chapter I, Section 5.b

b. 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. Questions concerning the DOE poster may be brought to the attention of the contractor or to the field organization.

REQUIREMENT SOURCE: DOE ORDER 5483.1A, Chapter I, Section 5.c

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 II-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.

REQUIREMENT SOURCE: PUBLIC LAW 91-596, Revision 1, Section 5(a)(1)

Each employer - shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

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19.1.2 Occupational Safety and Health Goals and Objectives

REQUIREMENT SOURCE: 54 FR 3904, Dated 01-26-89, Guidelines, (c)(1)(ii)

Author's Note: Implementation of the "Voluntary Protection Program" (VPP) is a dual responsibility of the Fluor Daniel Hanford Contract (FDHC) organization and the facility. The facility is responsible for implementing the program per FDHC direction. The requirements of 54 FR 3904 (with the exception of (c)(1)(ii)) are listed in the FDH Contract level Occupational Safety and Health Functional Area and will not be duplicated here.

Establish and communicate a clear goal for the safety and health program and objectives for meeting that goal, so that all members of the organization understand the results desired and the measures planned for achieving them.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.e

Facilities, Instrumentation, and Technical Support Personnel shall be available to implement the requirements of this Order. Provisions shall be made to take and analyze air and water samples and bioassay specimens, and to test, calibrate, and maintain instruments. Where it is impractical to provide these services on-site, the services of off-site laboratory facilities and instrument services shall be retained.

19.1.3 Requests for Exemptions/Variations

REQUIREMENT SOURCE: DOE ORDER 5483.1A, Chapter I, Section 4.a

Temporary Variations.

(1) A contractor may apply to the appropriate CO or CO representative for a temporary variance from the DOE-prescribed OSHA standards. A request for a temporary variance shall contain:

(a) A specification of the standard from which the contractor seeks a variance.

(b) A representation that the contractor is portable to comply with the standard and a detailed statement of the reasons therefor.

(c) 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.

(d) A certification that the contractor has informed employees of the application by giving a copy

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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. A description of how employees have been informed shall be contained in the certification. The information to employees also shall inform them that they may comment on the request to the appropriate CO or CO representative.

(e) 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.

(2) The CO or CO representative, the safety and health manager, and other appropriate elements of the field organization shall review the contractor's request and the employees' comments and submit the field organization's recommendation, together with the contractor's request and contractor employee comments, to the Director of Operational Safety (EP-32) within 30 days of receipt of the request. After review and evaluation of the request, comments, and recommendation and after coordination with the appropriate program office(s), EP-32 shall approve a temporary variance if the request establishes that (a) the contractor is unable to comply with the standard because of unavailability of professional or technical personnel materials or equipment funding needed to come into compliance with the standard, or because necessary construction or alteration of facilities must be completed in order to comply; (b) the contractor is taking all available steps to safeguard employees against the hazards covered by the standard; and (c) the contractor has an effective program for coming into compliance with the standard as quickly as practicable.

(3) 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. Such a renewal also shall be in effect for no longer than 1 year. 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. Employees also shall be given an opportunity to review and comment on a request for a renewal as outlined on page I-2, paragraph 4a(1)(d).

(4) The Director of Operational Safety shall inform the field organization of the results of the evaluation of the request for a temporary variance or the extension thereof, within 180 days of receipt of the request.

REQUIREMENT SOURCE: DOE ORDER 5483.1A, Chapter I, Section 4.b

Permanent Variances.

(1) DOE contractors may apply to the appropriate CO or CO representative for a permanent variance from the prescribed OSHA standards. The request for variance shall contain the same information specified on page I-2, paragraphs 4a(1)(a)-(d). The CO or CO representative, the

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local safety and health office, and other appropriate elements of the field organization shall review the contractor's request and the employees comments and submit their recommendation together with the contractor's request and contractor employee comments, to the Director of Operational Safety (EP-32) within 30 days of receipt of the request. After review and evaluation of the request, comments, and recommendation, and after coordination with the appropriate program office, EP-32 shall submit a recommendation to the Assistant Secretary, Environmental Protection Safety, and Emergency Preparedness (EP-1), for consideration.

(2) If EP-1 determines that the contractor has demonstrated that the conditions practices, means, methods, operations, or processes to be used will provide employment and a place of employment which is as safe and healthful as those which would prevail if the contractor complied with the standard, a permanent variance shall be approved and the requesting organization shall be notified accordingly, within 180 days of receipt of the request by EP-32.

(3) However, if the permanent variance request is not approved by EP-1, the requesting organization shall be notified of the rationale for the determination, within 180 days of receipt of the request by EP-32.

19.2 Hazard Anticipation, Identification and Evaluation

19.2.1 Hazard Assessment

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.a(3)

Purchasing and Contracting Organizations should be required to:

(a) participate as requested by the industrial hygiene staff to assure that potentially hazardous material or equipment being procured are adequately identified, evaluated, and controlled; and

(b) require contractors or subcontractors performing potentially hazardous operations within a DOE or DOE-controlled facility to comply with the mandatory industrial hygiene standards of DOE 5480.4 and make provisions to allow the industrial hygiene staff to monitor compliance.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.b(1)

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.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.b(2)

Hazard Evaluation. Once potential health hazards are identified, the industrial hygiene staff must

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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. 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. The permissible exposure limits used in hazard evaluation shall not exceed those in the mandatory industrial hygiene standards of DOE 5480.4, Attachment 2, paragraph 2.d.(3). When a potential health hazard is identified that has no assigned permissible exposure limit, a guideline on evaluation and control should be developed based on the best available information (refer to paragraph 10.a.(1)).

19.2.2 Hazards Reporting System

Additional requirements for this subelement are found in the Occupational Safety and Health Functional Area of the FDH Contract S/RID.

REQUIREMENT SOURCE: DOE ORDER 5483.1A, Chapter I, Section 5.a.(1)

All contractor employees shall be instructed by the contractor to:

(1) 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.

19.2.3 Investigation of Occurrences, Accidents, and Near Misses

These requirements are implemented by the OSHA Program for all FDHC facilities at the Hanford Site, and are contained in the FDH Contract S/RID.

19.2.4 Injury and Illness Trend Analysis

Refer to the Occupational Safety and Health Functional Area of the FDH Contract level S/RID.

19.2.5 Occupational Safety and Health Hazard Inventory System

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.f(1)

An inventory of occupational health hazards shall be maintained. The inventory should be a listing of potential chemical, physical, and biological health hazards by location and/or job category of users and indicate when the hazards were present.

19.3 OSH Hazard Prevention and Control

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This element interfaces with and relies upon support from other Functional Areas such as Operations, Fire Protection, Maintenance, Nuclear Safety, Quality Assurance, and Radiation Protection.

19.3.1 Hazard Monitoring, Sampling, and Surveillance

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.b(4)

Periodic Review. The satisfactory control of occupational health hazards shall be given continuing attention despite the imposition of control measures. Periodic monitoring is essential to assure maintenance of satisfactory conditions. The industrial hygiene staff shall determine the type and frequency of periodic monitoring. 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. Employees of DOE contractor organizations shall be provided the results of the monitoring program for toxic materials or harmful physical agents, upon request.

19.3.2 Hazard Controls

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subject Index for 29 CFR Part 1910

Author's Note: Only 29 CFR 1910.1000, .1001, .1020, .1025, .1030, .1200, and .1450 apply to the 324 facility.

- 1910.1000 Air contaminants.
- 1910.1001 Asbestos.
- 1910.1002 Coal tar pitch volatiles; interpretation of term.
- 1910.1003 13 Carcinogens (4-Nitrobiphenyl, etc.).
- 1910.1004 alpha-Naphthylamine.
- 1910.1005 [Reserved]
- 1910.1006 Methyl chloromethyl ether.
- 1910.1007 3,3'-Dichlorobenzidine (and its salts).
- 1910.1008 bis-Chloromethyl ether.
- 1910.1009 beta-Naphthylamine.
- 1910.1010 Benzidine.
- 1910.1011 4-Aminodiphenyl.
- 1910.1012 Ethyleneimine.
- 1910.1013 beta-Propiolactone.
- 1910.1014 2-Acetylaminofluorene.
- 1910.1015 4-Dimethylaminoazobenzene.
- 1910.1016 N-Nitrosodimethylamine.
- 1910.1017 Vinyl chloride.

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1910.1018 Inorganic arsenic.
1910.1020 Access to employee exposure and medical records.
1910.1025 Lead.
1910.1027 Cadmium.
1910.1028 Benzene.
1910.1029 Coke oven emissions.
1910.1030 Bloodborne pathogens.
1910.1043 Cotton dust.
1910.1044 1,2-dibromo-3-chloropropane.
1910.1045 Acrylonitrile.
1910.1047 Ethylene oxide.
1910.1048 Formaldehyde.
1910.1050 Methylenedianiline.
1910.1096 Ionizing radiation.
1910.1200 Hazard communication.
1910.1201 Retention of DOT markings, placards and labels.
1910.1450 Occupational exposure to hazardous chemicals in laboratories.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subpart D - Walking-Working Surfaces

1910.21 Definitions.
1910.22 General requirements.
1910.23 Guarding floor and wall openings and holes.
1910.24 Fixed industrial stairs.
1910.25 Portable wood ladders.
1910.26 Portable metal ladders.
1910.27 Fixed ladders.
1910.28 Safety requirements for scaffolding.
1910.29 Manually propelled mobile ladder stands and scaffolds (towers).
1910.30 Other working surfaces.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subpart E - Means of Egress

1910.35 Definitions.
1910.36 General requirements.
1910.37 Means of egress, general.
1910.38 Employee emergency plans and fire prevention plans.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subpart F - Powered Platforms, Manlifts, & Vehicle-Mounted Work Platforms

1910.66 Powered platforms for building maintenance.

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1910.67 Vehicle-mounted elevating and rotating work platforms.
1910.68 Manlifts.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subpart G - Occupational Health and Environmental Control

1910.94 Ventilation.
1910.95 Occupational noise exposure.
1910.97 Nonionizing radiation.
1910.98 Effective dates.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subpart H - Hazardous Materials

Author's Note: 29 CFR 1910.108 and .110 are not applicable to the 324 facility.

1910.101 Compressed gases (general requirements).
1910.102 Acetylene.
1910.103 Hydrogen.
1910.104 Oxygen.
1910.105 Nitrous oxide.
1910.106 Flammable and combustible liquids.
1910.107 Spray finishing using flammable and combustible materials.
1910.108 Dip tanks containing flammable or combustible liquids.
1910.109 Explosives and blasting agents.
1910.110 Storage and handling of liquefied petroleum gases.
1910.111 Storage and handling of anhydrous ammonia.
1910.112-1910.113 [Reserved]
1910.119 Process safety management of highly hazardous chemicals.
1910.120 Hazardous waste operations and emergency response.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subpart I - Personal Protective Equipment

1910.132 General requirements.
1910.133 Eye and face protection.
1910.134 Respiratory protection.
1910.135 Head protection.
1910.136 Foot protection.
1910.137 Electrical protective equipment.
1910.138 Hand protection.

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REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subpart J - General Environmental Controls

- 1910.141 Sanitation.
- 1910.142 Temporary labor camps.
- 1910.143 Nonwater carriage disposal systems. [Reserved]
- 1910.144 Safety color code for marking physical hazards.
- 1910.145 Specifications for accident prevention signs and tags.
- 1910.146 Permit-required confined spaces.
- 1910.147 The control of hazardous energy (lockout/tagout).

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subpart M - Compressed Gas & Compressed Air Equipment

- 1910.166-1910.168 [Reserved]
- 1910.169 Air receivers.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subpart N - Materials Handling and Storage

Author's Note: 29 CFR 1910.177 and .183 are not applicable to the 324 facility.

- 1910.176 Handling materials-general.
- 1910.177 Servicing multi-piece and single piece rim wheels.
- 1910.178 Powered industrial trucks.
- 1910.179 Overhead and gantry cranes.
- 1910.180 Crawler locomotive and truck cranes.
- 1910.181 Derricks.
- 1910.183 Helicopters.
- 1910.184 Slings.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subpart O - Machinery and Machine Guarding

- 1910.211 Definitions.
- 1910.212 General requirements for all machines.
- 1910.213 Woodworking machinery requirements.
- 1910.214 Cooperage machinery. [Reserved]
- 1910.215 Abrasive wheel machinery.
- 1910.216 Mills and calenders in the rubber and plastics industries.
- 1910.217 Mechanical power presses.
- 1910.218 Forging machines.
- 1910.219 Mechanical power-transmission apparatus.

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REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subpart P - Hand & Portable Powered Tools & Other Hand Held Equipment

- 1910.241 Definitions.
- 1910.242 Hand and portable powered tools and equipment, general.
- 1910.243 Guarding of portable powered tools.
- 1910.244 Other portable tools and equipment.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subpart Q - Welding, Cutting, and Brazing

- 1910.251 Definitions.
- 1910.252 General requirements.
- 1910.253 Oxygen-fuel gas welding and cutting.
- 1910.254 Arc welding and cutting.
- 1910.255 Resistance welding.

REQUIREMENT SOURCE: 29 CFR 1910, Dated 07-01-95, Subpart S - Electrical

GENERAL

- 1910.301 Introduction.

DESIGN SAFETY STANDARDS FOR ELECTRICAL SYSTEMS

- 1910.302 Electric utilization systems.
- 1910.303 General requirements.
- 1910.304 Wiring design and protection.
- 1910.305 Wiring methods, components, and equipment for general use.
- 1910.306 Specific purpose equipment and installations.
- 1910.307 Hazardous (classified) locations.
- 1910.308 Special systems.
- 1910.309-1910.330 [Reserved]

SAFETY-RELATED WORK PRACTICES

- 1910.331 Scope.
- 1910.332 Training.
- 1910.333 Selection and use of work practices.
- 1910.334 Use of equipment.
- 1910.335 Safeguards for personnel protection.
- 1910.336-1910.360 [Reserved]

SAFETY-RELATED MAINTENANCE REQUIREMENTS

- 1910.361-1910.380 [Reserved]

DEFINITIONS

- 1910.399 Definitions applicable to this subpart.

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REQUIREMENT SOURCE: ANSI Z 88.2-1992, Revision 3, Respiratory Protection

Has requirements that pertain to Respiratory Protection.

REQUIREMENT SOURCE: ANSI Z136.1, Part 1.1, Scope

This standard provides recommendations for the safe use of lasers and laser systems that operate at wavelengths between 180nm and 1mm.

REQUIREMENT SOURCE: DOE ORDER 5480. 4, Revision C04, Attachment 2, Section 2.d.(3)(a)

"TLVs R(SUPERScript) Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment with Intended Changes," most current edition (ACGIH).

REQUIREMENT SOURCE: DOE ORDER 5480. 4, Revision C04, Attachment 2, Section 2.e.(1)(b)

Sections I-XI, "Boiler and Pressure Vessel Code" (ASME).

REQUIREMENT SOURCE: DOE ORDER 5480. 4, Revision C04, Attachment 2, Section 2.e.(3)(a)

ANSI B-30 Series (ANSI).

REQUIREMENT SOURCE: DOE ORDER 5480. 4, Revision C04, Attachment 2, Section 2.e.(5)(a) and (b)

- (a) ANSI/NFPA 70-1981, "National Electrical Code" (ANSI).
- (b) ANSI C2-1981, "National Electrical Safety Code" (ANSI).

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.b(3)

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. The industrial hygiene staff shall formally recommend control measures to the first level supervisor who must respond promptly. Where feasible, engineering control measures, process change, or material substitution shall be used to prevent or minimize exposure to hazards. Administrative controls and personal protective equipment should supplement engineering controls as appropriate.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.c(4)(b)

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Regulated areas shall be established where chemical carcinogens are used. 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. A record shall be maintained of all personnel working in regulated areas.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.c(4)(d)

Signs warning of the presence of chemical carcinogens shall be posted at all entrances to regulated work areas. Labels should be used on all carcinogen containers to identify the chemical and to warn of the carcinogenic hazard.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.c(4)(e)

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.

19.4 Occupational Health Program

The Occupational Medical Contractor (OMC) is a primary provider of medical services to the Hanford Site. Requirements applicable to medical activities are contained in OMC specific documents.

19.4.1 Health Examinations

REQUIREMENT SOURCE: DOE ORDER 5480. 8A, Revision C01, Section 11.b(3)(a)

Preplacement Evaluations.

1 A medical evaluation of an individual shall be conducted after the job offer, but prior to the performance of job duties, and in the case of an employee, prior to a job transfer. The health status and fitness for duty of the individual shall be determined, thereby assuring that assigned duties can be performed in a safe and reliable manner and consistent with the Americans with Disabilities Act of 1990.

2 Contractor management shall provide to the Site Occupational Medical Director a job task analysis pertaining to the applicant/employee to enable the medical examiner to assess the individual as required in 11b(3)(a)1.

3 The scope of the initial preplacement evaluation shall be a comprehensive examination as outlined in paragraph 11b(2). The Site Occupational Medical Director shall determine additional examination content, considering such factors as special physical or mental requirements of the job, potential hazardous exposures, or medical surveillance requirements mandated by the

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Occupational Safety and Health Act, 29 CFR 1910 or 29 CFR 1926.

4 Those contractor operations requiring large numbers of preplacement evaluations may defer the comprehensive evaluation of individuals not assigned to hazardous work or potentially hazardous exposures after a review of the individual's medical history. The evaluation shall be performed within 6 months of the hire date.

5 The occupational medical department shall be informed of all job transfers. The Occupational Medical Director or designee should determine whether a medical evaluation is necessary.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.b(6)

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. The industrial hygiene staff should be available to accompany medical staff on periodic worksite visits (refer to DOE 5480.1A, Chapter VIII, paragraph 4a(2)).

19.4.2 Health Maintenance

Requirements for this sub-subelement are covered in the Occupational Safety and Health Functional Area of the FDH Contract level S/RID.

19.4.3 Diagnosis and Treatment

Diagnosis and Treatment requirements are implemented by the Occupational Medical Contractor (OMC).

19.4.4 Fitness for Duty

Fitness for Duty requirements are implemented by the Occupational Medical Contractor (OMC).

19.4.5 Medical Facilities and Equipment

Medical facilities and equipment requirements are implemented by the Occupational Medical Contractor (OMC).

19.4.6 Professional Development of Occupational Staff

Professional development of occupational staff requirements are implemented by the Occupational Medical Contractor (OMC).

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19.4.7 Health Records and Reporting

All medical records are maintained by the Occupational Medical Contractor (OMC).

19.5 Occupational Safety and Health Training

Additional requirements for this subelement are found in the Occupational Safety and Health Functional Area of the FDH Contract level S/RID.

REQUIREMENT SOURCE: DOE ORDER 1324.5B, Attachment 2

CONTRACTOR REQUIREMENTS

As a minimum requirement, for records maintained under the contract: (1) Adequate and proper documentation shall be created and maintained for all activities carried out under the contract. (2) A records management program shall be established that provides for having all records approved for disposition by the National Archives and Records Administration. This shall be accomplished by having an approved records disposition schedule for every records series maintained.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.a(4)

First-line Supervisors should be required to:

- (a) maintain healthful working conditions within his or her own organization and implement industrial hygiene recommendations;
- (b) train employees to perform assignments in a safe manner; and
- (c) follow administrative procedures to allow appropriate disciplinary action to be taken when health and safety rules are violated.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.b(5)

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. The program shall include written notification of employees of environmental monitoring results when the results indicate that the employees are exposed above permissible limits. Training should include information on operations that may lead to exposure, the potential health effects of the hazard, the content of applicable standards, and the purpose and results of environmental monitoring. Training should be updated and repeated periodically.

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19.6 Recordkeeping and Reporting

REQUIREMENT SOURCE: DOE ORDER 5483.1A, Chapter I, Section 6.f.

Author's Note: EP is now EH.

Upon completion of the inspection, the DOE inspector shall hold a closeout meeting with the contractor management and, if requested, with the employees or authorized employee representatives to inform them of the inspection findings. A combined meeting may be held if the participants agree. When the inspection discloses a violation of the DOE-prescribed OSHA standards, a copy of the notice of violation with abatement dates will be transmitted formally from the CO or CO representative within 30 days after the completion of the inspection. 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). 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. Contractor employees or authorized representatives of employees may file written notices with the CO or CO representative in situations where they believe that the time fixed for abatement is unreasonable. The CO or CO representative, the safety and health director, and other appropriate elements of the field organization shall review the written notice and provide a written response thereto within 15 days of receipt. If not satisfied with the field organization's response, the employee or representative thereof may refer, in writing, unresolved differences to the Director of Operational Safety (EP-32) for resolution. EP-32 shall review and evaluate such referrals in consultation with the appropriate program office(s). Based on their evaluation, a recommended course of action to resolve the problem shall be provided to the field organization. Within 30 days of the request, EP-32 shall provide a written response to the employee or representative thereof which details the actions taken and the rationale therefor.

19.6.1 Occupational Injury and Illness Reporting

Additional requirements for this subelement are found in the Occupational Safety and Health Functional Area of the FDH Contract level S/RID.

REQUIREMENT SOURCE: 29 CFR 1904, Dated 07-01-95, 29 CFR 1904 - Recording and Reporting Occupational Injuries and Illness

Author's Note: Only 29 CFR 1904.2, .3, .4, .5, .6, .7, .8, and .9 apply to the 324 Facility.

1904.1 Purpose and scope.

1904.2 Log and summary of occupational injuries and illnesses.

1904.3 Period covered.

1904.4 Supplementary record.

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- 1904.5 Annual summary.
- 1904.6 Retention of records.
- 1904.7 Access to records.
- 1904.8 Reporting of fatality or multiple hospitalization incidents.
- 1904.9 Falsification, or failure to keep records or reports.
- 1904.10 Recordkeeping under approved State plans.
- 1904.11 Change of ownership.
- 1904.12 Definitions.
- 1904.13 Petitions for recordkeeping exceptions.
- 1904.14 Employees not in fixed establishments.
- 1904.15 Small employers.
- 1904.16 Establishments classified in Standard Industrial Classification Codes (SIC) 52-89, (except 52-54, 70, 75, 76, 79 and 80).
- STATISTICAL REPORTING OF OCCUPATIONAL INJURIES AND ILLNESSES**
- 1904.20 Description of statistical program.
- 1904.21 Duties of employers.
- 1904.22 Effect of State plans.

REQUIREMENT SOURCE: DOE ORDER 5480.10, Section 9.f(2)

The industrial hygiene staff's evaluation of potential health hazards shall be documented in written reports. If a deficiency is identified the report shall recommend corrective actions. The report, along with any response from line management and/or documentation of corrective actions, shall be retained.

REQUIREMENT SOURCE: DOE ORDER 5483.1A, Chapter I, Section 5.d

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." 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. 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. 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.

REQUIREMENT SOURCE: DOE ORDER 5483.1A, Chapter I, Section 5.e

All contractor employees or former employees shall have access to their personal safety, health,

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and medical records consistent with the provisions of the Freedom of Information Act and the Privacy Act.

REQUIREMENT SOURCE: DOE ORDER 5483.1A, Chapter III, Section 2

Author's Note: The text of this requirement is verbatim from the order. It is understood that DOE Order 5484.1 dated 2-24-81 has been superseded. The current revision of DOE Order 5484.1 will be utilized for recording and reporting occupational illnesses and injuries.

RECORDKEEPING.

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.

b. All contractors shall be responsible for maintaining records of employees exposures to toxic materials or harmful physical agents as appropriate. Such records shall be maintained in perpetuity.

c. A central file of all violations of DOE-prescribed OSHA standards noted during inspections (and abatement actions) shall be maintained by field organizations. A central file also shall be maintained by the field organizations of formal employee safety and health complaints and their disposition. Upon request, any of these safety and health violation or complaint-related records shall be made available for review by employees directly affected by such information, or by their authorized representatives. DOE 1324.1, RECORDS DISPOSITION, of 5-28-80, Attachment IV, DOE Records Schedule 25, paragraph 1b, specifies the retention period for these records.

d. 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. 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. 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."

REQUIREMENT SOURCE: DOE ORDER 5483.1A, Chapter III, Section 3

3. POSTING.

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- 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.
- 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.
- c. The required forms shall be posted in a sufficient number of places to permit contractor employees working in or frequenting any portion of the GOCO facility to observe the information on the way to or from their place of employment.

19.6.2 Occurrence Reporting

These requirements are completely addressed by the Management Systems Functional Area.

19.7 KEY INTERFACES

19.7.1 Engineering Program

The Engineering Program Functional Area defines the processes necessary to design engineering controls for health and safety hazards. This interface is essential during the actual design or pre-engineering phase.

19.7.2 Emergency Management

The OS&H Program provides the Emergency Management Functional Area with the necessary emergency planning support to ensure proper use and delineation of OS&H regulations and procedures. The OS&H Organization shall also provide support for exercises and training.

19.7.3 Maintenance

The Maintenance Functional Area interfaces with the OS&H Program during all routine and non-routine maintenance activities. All personnel health and safety training shall be completed and hazard controls implemented prior to performing work.

19.7.4 Operations

The Operations Organization depends on the controls outlined in the Health and Safety Program to safely operate. Workplace hazard identification and assessment is accomplished through walkdown inspections, surveys, monitoring and surveillance. Based on the hazards identified the necessary controls are defined and implemented to ensure safe

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operations. The Operations Organization should work closely with the Occupational Safety and Health Program on all routine and non-routine operations.

19.7.5 Radiation Protection

Personnel working in radiological controlled areas must adhere to all As-Low-As-Reasonably-Achievable (ALARA) policies and Occupational Safety and Health Act (OSHA) controls. The Radiation Protection Functional Area must coordinate all routine and non-routine activities with the OS&H Program.

19.7.6 Training and Qualification

Training is an integral part of any effective health and safety program. The OS&H Program provides the necessary information and support to the training program to ensure that effective health and safety training is developed and conducted. The training organization shall properly document all health and safety training and maintain all such documentation in accordance with established procedures.

19.7.7 Construction Program

All construction activities shall adhere to the Federal OSHA Regulations 29CFR1926. However, the 324 facility is a general industry facility that has modifications ongoing by outside contractors, however, construction is not an integral part of the 324 operations or their current and future mission. Therefore, 29 CFR 1926 (OSHA Construction) is not currently applicable to the 324 facility.

19.7.8 Management Systems

The Management Systems Functional Area provides the necessary controls for developing, using, and maintaining facility policies and procedures. In addition, the Health and Safety Organization shall participate in occurrence/event reporting activities which are included in this area. In addition, the Management Systems Functional Area provides the necessary controls for the self-assessment of programs, with noncompliances being identified and tracked for corrective action in the Corrective Action Management System (CAMS).

19.7.9 Packaging and Transportation

The packaging and transportation of materials (both nuclear and non-nuclear) involves significant interaction with the OSH Program. Specific subjects of concern include safe handling of hazardous materials and chemicals, hoisting and rigging, personal protective equipment, etc.

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19.7.10 Safeguards and Security

The Safeguards and Security organization has a limited interaction with the OSH Program concerning the safe handling of firearms and explosives.

19.7.11 Quality Assurance

The Quality Assurance Function Area interfaces with the Occupational Safety and Health Functional Area by establishing the organization's approach to the management of quality (e.g., appropriate retention of documents and records, quality work processes, hardware quality requirements, and independent assessments).

19.7.12 Fire Protection

An integrated approach is taken between the Occupational Safety and Health Functional Area and the Fire Protection Function Area to ensure current standards and guidelines for protection of workers are appropriately coordinated.

19.7.13 Waste Management

The Waste Management Functional Area relies on the Occupational Safety and Health Functional Area for health and safety controls. The Occupational Safety and Health Functional Area provides implementing procedures to control hazardous or toxic materials; physical hazards; hazards identification, surveillance, and communication ; asbestos removal operations; hazardous materials handling and emergency response; posting of danger signs and tags; storage of pressurized gases; lockout and tag-out activities ; and explosive/combustible materials handling.

19.7.14 Nuclear Safety

Occupational Safety and Health provides information to the Nuclear Safety Functional Area regarding requirements to mitigate health related effects from hazardous substance and physical hazards.

19.7.15 Environmental Protection

The Occupational Safety and Health Functional Area routinely interfaces with the Environmental Protection Functional Area to ensure worker safety in responding to environmental incidents.

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19.8 References

19.8.1 Requirement Source Documents

For references, see attached report titled "RIDs by Document X-Reference Listing".

19.8.2 Reviewed Documents Not Used as Requirement Sources

The following documents were reviewed as requirement sources but were not used in the development of this S/RID:

29 CFR 1926, Occupational Safety and Health Administration, Labor, July 1, 1994.

WAC, Chapter 173, Washington Administrative Code, Dangerous Waste Regulations, June 1993.

WAC 296-24, Washington Administrative Code, Industrial Safety and Health Standards, June 1993.

WAC-296-155, Industrial Safety and Health Standards for construction, June 1993

DOE 5480.19, Conduct of Operations Requirements for DOE Facilities, May 19, 1992.

DOE 5480.20, Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities, February 20, 1991.

DOE 5484.1, Environmental Protection, Safety and Health Protection Information Reporting Requirements, February 24, 1981.

DOE 6430.1A, General Design Criteria, April 6, 1981.

DOE-RL-92-36, Hanford Site Hoisting and Rigging Manual, January 1993.

RLIP 5480.4C, Environmental Protection, Safety, and Health Protection Standards For RL, November 6, 1992.

DOE-STD-1030-92, Guide to Good Practices for Lockouts and Tagouts, United States Department of Energy, November 92.

EEI Guide to Effective Drug and Alcohol/Fitness for Duty Policy Development, August

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1985.

DOE/EH 0135 Criteria for Technical Safety Appraisals. June 1990.

ANSI-Z244.1-1982, American National Standard for personnel protection, lockout/tagout of energy sources, minimum safety requirements, Approved March 8, 1982.

RIDs by Document X-Reference Listing
Based on 324-OH-SD RID and including all documents.

29 CFR 1904, Recording and Reporting Occupational Injury and Illnesses, Dated 07-01-95

29 CFR 1910, Occupational Safety and Health Standards, Dated 07-01-95

54 FR 3904, Safety And Health Program Management Guidelines: Issuance Of Voluntary Guideline: Notice, Dated 01-26-89

ANSI Z 88.2-1992, Respiratory Protection, Revision 3

ANSI Z136.1, American National Standard For The Safe Use Of Lasers

DOE ORDER 1324.5B, Records Management Program

DOE ORDER 5480. 4, Environmental Protection, Safety and Health Protection Standards, Revision C04

DOE ORDER 5480. 8A, Contract Occupational Medical Program, Revision C01

DOE ORDER 5480.10, Contractor Industrial Hygiene Program

DOE ORDER 5483.1A, Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor-Operated Facilities

PUBLIC LAW 91-596, Public Law 91-596, Revision 1

***** End of RIDs by Document X-Reference Listing *****

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20.0 Environmental Protection

A Standards/Requirements Identification Document (S/RID) is the total list of the Environment, Safety and Health (ES&H) requirements to be implemented by a site, facility, or activity. These requirements are appropriate to the life cycle phase to achieve an adequate level of protection for worker and public health and safety, and the environment during design, construction, operation, decontamination and decommissioning, and environmental restoration. S/RIDs are living documents, to be revised appropriately based on change in the site's or facility's mission or configuration, a change in the facility's life cycle phase, or a change to the applicable standards/requirements. S/RIDs encompass health and safety, environmental, and "safety-related" safeguards and security (S&S) standards/requirements related to the functional areas listed in the U.S. Department of Energy (DOE) Environment, Safety and Health Configuration Guide.

The Fluor Daniel Hanford (FDH) Contract S/RID contains standards/requirements, applicable to FDH and FDH subcontractors, necessary for safe operation of Project Hanford Management Contract (PHMC) facilities, that are not the direct responsibility of the facility manager (e.g., a site-wide fire department). Facility S/RIDs contain standards/requirements applicable to a specific facility that are the direct responsibility of the facility manager.

S/RIDs are prepared by those responsible for managing the operation of facilities or the conduct of activities that present a potential threat to the health and safety of workers, public, or the environment, including:

- Hazard Category 1 and 2 nuclear facilities and activities, as defined in DOE 5480.23.
- Selected Hazard Category 3 nuclear, and Low Hazard non-nuclear facilities and activities, as agreed upon by RL.

The Waste Technology Engineering Laboratory (324 building) S/RID contains standards/requirements that are necessary for safe operation of the facility, and other building/areas that are the direct responsibility of the specific facility manager. The Environmental Protection Program defined in this document is described in general accordance with the Environment, Safety, and Health Configuration Guide, Revision 0, dated July 30, 1993, and is presented in program elements and subelements. The specific DOE Orders, regulations, industry codes/standards, guidance documents and good industry practices that serve as the basis for each element/subelement are identified and aligned with each subelement.

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This S/RID contains only those requirements that 324 building personnel are clearly responsible to satisfy. Other requirements that are applicable to 324 building, but are satisfied by others, are defined in the Fluor Daniel Hanford (FDH) Contract level S/RID. Some requirements in the FDH Contract S/RID involve implementation responsibilities by both the facility and a central support group. Such requirements may be addressed in both the Contract and the Facility S/RIDs. For application in this S/RID, the words "shall" and "should" in requirements statements both indicate mandatory compliance. The Key Interface information contained in the Functional Area documents is provided for general recognition and understanding and is not considered to contain prescriptive requirements.

SCOPE

The requirements of this S/RID are applicable to all operations occurring within the 324 building and support facilities including the storage vault, located in the basement, the craft shop the exhaust stack and stack monitoring facility.

The Waste Technology Engineering Laboratory, located in the 324 Building, consists of a "hot side" and a "cold side." The hot side consists of the Radiochemical Engineering Complex (REC) and the Shielded Materials Facility (SMF). The REC is comprised of four hot cells for handling highly radioactive material and an airlock that allows equipment to be moved into and out of the cells. The REC is supported by eight low-level and high-level vault tanks. The SMF consists of two hot cells and an airlock. Both the SMF and REC are supported by a truck lock, a cask handling area, and a manipulator repair and maintenance shop.

Major programmatic activities in the REC include the B Cell Clean out Safety Project, the Federal Republic of Germany (FRG) sealed isotopic heat sources project, and various waste removal activities. Programmatic activities in the SMF include the Cesium (Cs) Legacy Safety Program, the 327 Building Fuel Pins and Pieces Removal Project, and support the Pacific Nuclear Fuel Development Corporation (PNC) project. In addition, the SMF provides support to 327 Building waste handling and material transfers. All of the activities in the REC and SMF support cleanup and deactivation of the 324 Building to support deactivation to a safe endstate.

20.1 Environmental Policy Management

This element addresses the management and organization of an effective EP Program. Formal organization of the Program is necessary to ensure that a deliberate and controlled approach to Program management and execution is achieved. Establishment of such a

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formal organization enhances the potential for achievement of improved levels of safety performance, compliance, and efficiency.

This element does not address certain environmental programs implemented at the site level such as the Endangered Species Act and the National Historic Preservation Act. Requirements which require implementation at the facility level will appear in this element as a facility requirement and may also be included in the FDH Contract level S/RID document as a contract level requirement.

This subelement specifies requirements for environmental project and program management decision making and documentation processes for compliance with the National Environmental Policy Act (NEPA).

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter V, Section 3.d.(1)

Characterization. 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. The baseline data shall include:

- (a) Drawings, photographs, and other records reflecting the as-built and as-modified condition of the facility and grounds;
- (b) The condition of all structures, existing protective barriers, and systems installed to ensure public, occupational, and environmental safety;
- (c) The type, form, quantity, and location of hazardous chemical and radioactive material from past operations at the site; and
- (d) 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter V, Section 3.d.(2)

Environmental Review Process. 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. Based on the results of the remedial investigation/feasibility study and any additional data deemed necessary by the responsible field

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organization, an appropriate environmental review shall be performed according to the requirements of the 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. Candidate decommissioning alternatives shall be identified, assessed, and evaluated, and a preferred decommissioning alternative selected based on the results of the environmental review.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter V, Section 3.d.(3)

Engineering. 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. Detailed engineering will be initiated after a preferred alternative is selected. A Decommissioning Project Plan shall be prepared for approval by the appropriate program office in compliance with DOE 4700.1. The Plan shall include the following:

- (a) Physical, chemical, and radiological characterizational data or references to such data;
- (b) A summary evaluation of decommissioning alternatives for the facility including the preferred alternative;
- (c) 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;
- (d) 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);
- (e) Projections of occupational exposure;
- (f) Estimated quantities of radioactive waste to be generated; and
- (g) Detailed administrative, cost, schedule, and management information.

20.2 Permits

This element specifies the requirements for identifying necessary permits, permit application processes, and permit contents. Permitting requirements for water, air, and hazardous waste management facilities are specified.

20.2.1 Clean Water Permits

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The 324 facility has four liquid waste systems: sanitary sewer, process sewer, retention process system, and radioactive liquid waste system (which discharges to the 340 building). These streams are not permitted. Liquid waste is characterized on a case-by-case basis for transfer to the 340 Facility or the 300 Area Treated Effluent Disposal Facility (TEDF), which disposes liquid waste in accordance with a clean water permit for the 300 Area TEDF.

20.2.2 Clean Air Permits

The requirements in this subelement deal with new or modified air emission sources. Requirements are included from 40 CFR Part 61 Subpart H, WAC 246-247, WAC 173-400, and WAC 173-460.

REQUIREMENT SOURCE: 40 CFR 61, Dated 07-01-95, Part 7

- (a) The owner or operator shall submit to the Administrator an application for approval of the construction of any new source or modification of any existing source. The application shall be submitted before the construction or modification is planned to commence, or within 30 days after the effective date if the construction or modification had commenced before the effective date and initial startup has not occurred. A separate application shall be submitted for each stationary source.
- (b) Each application for approval of construction shall include-
- (1) The name and address of the applicant;
 - (2) The location or proposed location of the source; and
 - (3) Technical information describing the proposed nature, size, design, operating design capacity, and method of operation of the source, including a description of any equipment to be used for control of emissions. Such technical information shall include calculations of emission estimates in sufficient detail to permit assessment of the validity of the calculations.
- (c) Each application for approval of modification shall include, in addition to the information required in paragraph (b) of this section-
- (1) The precise nature of the proposed changes;
 - (2) The productive capacity of the source before and after the changes are completed; and
 - (3) Calculations of estimates of emissions before and after the changes are completed, in sufficient detail to permit assessment of the validity of the calculations.

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REQUIREMENT SOURCE: 40 CFR 61, Dated 07-01-95, Part 9

Notification of startup.

(a) The owner or operator of each stationary source which has an initial startup after the effective date of a standard shall furnish the Administrator with written notification as follows:

(1) A notification of the anticipated date of initial startup of the source not more than 60 days nor less than 30 days before that date.

(2) A notification of the actual date of initial startup of the source within 15 days after that date.

(b) If any State or local agency requires a notice which contains all the information required in the notification in paragraph (a) of this section, sending the Administrator a copy of that notification will satisfy paragraph (a) of this section.

REQUIREMENT SOURCE: 40 CFR 61, Dated 07-01-95, Part 96

Applications to construct or modify.

(a) In addition to any activity that is defined as construction under 40 CFR part 61, subpart A, any fabrication, erection or installation of a new building or structure within a facility that emits radionuclides is also defined as new construction for purposes of 40 CFR part 61, subpart A.

(b) An application for approval under §61.07 or notification of startup under §61.09 does not need to be filed for any new construction of or modification within an existing facility if the effective dose equivalent, caused by all emissions from the new construction or modification, is less than 1% of the standard prescribed in §61.92. For purposes of this paragraph the effective dose equivalent shall be calculated using the source term derived using appendix D as input to the dispersion and other computer models described in §61.93. DOE may, with prior approval from EPA, use another procedure for estimating the source term for use in this paragraph. A facility is eligible for this exemption only if, based on its last annual report, the facility is in compliance with this subpart.

(c) Conditions to approvals granted under §61.08 will not contain requirements for post approval reporting on operating conditions beyond those specified in §61.94.

REQUIREMENT SOURCE: NWP 95-300/324 LAB, Approval Conditions, 3.

Operating and maintenance manuals for all equipment that has the potential to affect emissions to the atmosphere shall be developed and followed. Copies of the manuals shall be available to the department.

REQUIREMENT SOURCE: NWP 95-300/324 LAB, Approval Conditions, 4.

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Access to this building and all emission control systems by the department shall be permitted upon request for the purpose of compliance assurance inspections.

REQUIREMENT SOURCE: NWP 95-300/324 LAB, Approval Conditions, 5.

This approval shall become void if the modification of the project is not commenced within eighteen months of this order, or operation of the Zone III exhaust system is discontinued for a period of eighteen months.

REQUIREMENT SOURCE: WAC 173-400, Dated 09-13-96, Section 110(1)

Applicability.

(a) A notice of construction application must be filed by the owner or operator and an order of approval issued by ecology or an authority prior to the establishment of any new source or emission unit or modification which is listed in WAC 173-400-100 or required to obtain a permit under RCW 70.94.161.

(b) Ecology or the authority may require that a notice of construction application be filed by the owner or operator of a proposed new source or modification and an order of approval issued by ecology or an authority prior to the establishment of any new source or emission unit or modification, other than a single family or a duplex dwelling.

(c) New source review of a modification shall be limited to the emission unit or units proposed to be added to an existing source or modified and the air contaminants whose emissions would increase as a result of the modification.

REQUIREMENT SOURCE: WAC 173-400, Dated 09-13-96, Section 110(5)

Portable sources. For portable sources which locate temporarily at particular sites, the owners(s) or operator(s) shall be allowed to operate at the temporary location without filing a notice of construction application, providing that the owner(s) or operator(s) notifies ecology or the authority of intent to operate at the new location at least thirty days prior to starting the operation, and supplies sufficient information to enable ecology or the authority to determine that the operation will comply with the emission standards for a new source, and will not cause a violation of applicable ambient air quality standards and, if in a nonattainment area, will not interfere with scheduled attainment of ambient standards. The permission to operate shall be for a limited period of time (one year or less) and ecology or the authority may set specific conditions for operation during that period. A temporary source shall be required to comply with all applicable emission standards.

REQUIREMENT SOURCE: WAC 173-400, Dated 09-13-96, Section 110(6)

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Approval to construct or modify a stationary source shall become invalid if construction is not commenced within eighteen months after receipt of such approval, if construction is discontinued for a period of eighteen months or more, or if construction is not completed within a reasonable time. Ecology or the authority may extend the eighteen-month period upon a satisfactory showing that an extension is justified. This provision does not apply to the time period between construction of the approved phases of a phased construction project; each phase must commence construction within eighteen months of the projected and approved commencement date.

REQUIREMENT SOURCE: WAC 173-460, Dated 02-14-94, Section 040(1) Introduction

New source review.

Applicability. This chapter supplements the new source review requirements of WAC 173-400-110 by adding additional new source review requirements for toxic air pollutant sources. If a notice of construction is required under both chapter 173-400 WAC and this chapter, the written applications shall be combined. A notice of construction is a written application to permit construction of a new source.

REQUIREMENT SOURCE: WAC 173-460, Dated 02-14-94, Section 040(1)(a)

The owner or operator of a new toxic air pollutant source listed in WAC 173-460-030(1) shall notify the authority prior to the construction, installation, or establishment of a new toxic air pollutant source and shall file a notice of construction application with the authority for the proposed emission unit(s). Notification and notice of construction are not required if the source is an exempt source listed in WAC 173-460-(2) or subsection (2) of this section.

REQUIREMENT SOURCE: WAC 173-460, Dated 02-14-94, Section 040(2)

The owner or operator of a new toxic air pollutant source listed in WAC 173-460-030(1) is not required to notify or file a notice of construction with the authority if any of the following conditions are met:

- (a) Routine maintenance or repair requires equivalent replacement of air pollution control equipment; or
- (b) The new source is a minor process change that does not increase capacity and total toxic air pollutant emissions do not exceed the emission rates specified in small quantity emissions do not exceed the emission rate tables in WAC 173-460-080; or
- (c) The new source is the result of minor changes in raw material composition and the total toxic air pollutant emissions do not exceed the emission rates specified in the small quantity emission rate tables in WAC 173-460-080.

REQUIREMENT SOURCE: WAC 173-460, Dated 02-14-94, Section 040(4)

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Requirements for new toxic air pollutant sources. The authority shall review notice(s) of construction, plans, specifications, and other associated information to determine that:

- (a) The source will be in accord with applicable federal, state, and authority air pollution controls rules and regulations;
- (b) The source will use T-BACT for emissions control for the toxic air pollutants which are likely to increase; and
- (c) Sources required to use T-BACT for emission control demonstrate compliance with WAC 173-460-070 by using the procedures established in WAC 173-460-080 or, failing that, demonstrates compliance, by using the additional procedures in WAC 173-460-090 and/or 173-460-100.

REQUIREMENT SOURCE: WAC 173-460, Dated 02-14-94, Section 040(8)

Commencement of construction. The owner(s) or operator(s) of the new source shall not commence construction until the applicable notice of construction has been approved.

REQUIREMENT SOURCE: WAC 173-460, Dated 02-14-94, Section 050(1)(a)

Requirement to quantify emissions. New sources. When applying for a notice of construction, an owner or operator of a new toxic air pollution source shall quantify those emissions of each TAP or combination of TAP's that:

- (i) Will be used for the modeling procedures in WAC 173-460-080; and
- (ii) That may be discharged after applying required control technology. The information shall be submitted to the authority.

REQUIREMENT SOURCE: WAC 173-460, Dated 02-14-94, Section 050(1)(b)

Emissions shall be quantified in sufficient detail to determine whether the source complies with the requirements of this chapter.

REQUIREMENT SOURCE: WAC 173-460, Dated 02-14-94, Section 050(2)

Small quantity source.

Sources that choose to use small quantity emission rate tables instead of using dispersion modeling shall quantify emissions as required under WAC 173-460-080, in sufficient detail to demonstrate to the satisfaction of the authority that the emissions are less than the applicable emission rates listed in WAC 173-460-080.

REQUIREMENT SOURCE: WAC 173-460, Dated 02-14-94, Section 050(3)

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Level of detail. An acceptable source impact level analysis under WAC 173-460-080, may be based on a conservative estimate of emissions that represents good engineering judgment. If compliance with WAC 173-460-070 and 173-460-080 cannot be demonstrated, more precise emission estimates shall be used to demonstrate compliance with WAC 173-460-090.

REQUIREMENT SOURCE: WAC 173-460, Dated 02-14-94, Section 050(4)(a)

Mixtures of toxic air pollutants. An owner or operator of a source that may discharge more than one toxic air pollutant may demonstrate compliance with WAC 173-460-070 and 173-460-080 by:

- (i) Quantifying emissions and performing modeling for each TAP individually; or
- (ii) Calculating the sum of all TAP emissions and modeling for the total TAP emissions and comparing maximum ambient levels to the smallest ASIL; or
- (iii) Equivalent procedures may be used if approved by ecology.

REQUIREMENT SOURCE: WAC 173-460, Dated 02-14-94, Section 060 Introduction

Except as provided for in WAC 173-460-040, a person shall not establish, operate, or cause to be established or operated any new toxic air pollutant source which is likely to increase TAP emissions without installing and operating T-BACT. Satisfaction of the performance requirements listed below fulfill the T-BACT requirements for those particular sources. Local air pollution authorities may develop and require performance requirements in lieu of T-BACT provided that ecology approves the performance requirements as equivalent to T-BACT.

REQUIREMENT SOURCE: WAC 173-460, Dated 02-14-94, Section 070

When applying for a notice of construction under WAC 173-460-040, the owner or operator of a new toxic air pollutant source which is likely to increase TAP emissions shall demonstrate that emissions from the source are sufficiently low to protect human health and safety from potential carcinogenic and/or other toxic effects. Compliance shall be demonstrated in any area which does not have restricted or controlled public access. The source shall demonstrate compliance by using procedures established in this chapter after complying with the control technology requirements in WAC 173-460-060.

REQUIREMENT SOURCE: WAC 173-460, Dated 02-14-94, Section 080(1)

When applying for a notice of construction under WAC 173-460-040, the owner or operator of a new toxic air pollutant source which is likely to increase TAP emissions shall complete an acceptable source impact level analysis for Class A and Class B TAPs. The authority may complete this analysis.

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REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 060 Introduction

This section describes the information requirements for approval to construct, modify, and operate an emission unit. Any notice of construction (NOC) requires the submittal of the information listed in Appendix A. Complex projects may require additional information. The applicant should contact the department early in the conceptual design phase for guidance on applicable control technologies to consider.

Appendices B and C outline the procedures to demonstrate compliance with the BARCT and ALARACT standards. Based on the Appendix A information provided, the department may advise the applicant which subset of technologies to consider as candidates for meeting BARCT or ALARACT requirements.

For those facilities subject to the operating permit regulations in chapter 173-401 WAC, the radioactive air emissions license will be incorporated as an applicable portion of the air operating permit issued by the department of ecology or a local air pollution control authority. The department will be responsible for determining the facility's compliance with and enforcing the requirements of the radioactive air emissions license.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 060(1)

Requirements for new construction or modification of emission units.

- (a) Early in the design phase, the applicant shall submit a NOC containing the information required in Appendix A.
- (b) Within thirty days of receipt of the NOC, the department shall inform the applicant if additional information is required. The department may determine, on the basis of the information submitted, that the requirements of BARCT or ALARACT have been met, or may require the applicant to submit a BARCT or ALARACT demonstration compatible with Appendix B or C, respectively.
- (c) Within sixty days of receipt of all required information, the department shall issue an approval or denial to construct. The department may require changes to the final proposed control technology.
- (d) The applicant may request a phased approval process by so stating and submitting a limited application. The department may grant a conditional approval to construct for such activities as would not preclude the construction or installation of any control or monitoring equipment required after review of the completed application.
- (e) The department shall issue a license, or amend an existing license, authorizing operation of the emission unit(s) when the proposed new construction or modification is complete. For facilities subject to the air operating permit requirements of chapter 173-401 WAC, the license shall become part of the air operating permit issued by the department of ecology or a local air pollution control

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authority. For new construction, this action shall constitute registration of the emission unit(s).

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 060(2)

Requirements for modification of unregistered emission units that are not exempt from these regulations.

(a) The applicant shall submit an application containing the information required in Appendix A.

(b) Within thirty days of receipt of the application, the department shall inform the applicant if additional information is required. The department may determine, on the basis of the information submitted, that the requirements of BARCT or ALARACT demonstration compatible with Appendix B or C, respectively.

(c) Within sixty days of receipt of all required information, the department shall issue or amend the license. For facilities subject to the air operating permit requirements of chapter 173-401 WAC, the license shall become part of the air operating permit issued by the department of ecology or a local air pollution control authority. This action shall constitute registration of the emission unit(s). A determination of noncompliance may result in the issuance of a notice of violation.

(d) The department reserves the right to require the owner of an existing, unregistered emission unit to make modifications necessary to comply with the applicable standards of WAC 246-247-040.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 060(5)

The license shall specify the requirements and limitations of operation to assure compliance with this chapter. The facility shall comply with the requirements and limitations of the license.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 075(11)

The planning for any proposed new construction or significant modification of the emission unit must address accidental releases with a probability of occurrence during the expected life of the emission unit of greater than one percent.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 110, Appendix A

Application information requirements.

- (1) Name and address of the facility, and location (latitude and longitude) of the emission unit(s).
- (2) Name, title, address, and phone number of the responsible manager.
- (3) Identify the type of proposed action for which this application is submitted:

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- (a) Construction of new emission unit(s);
 - (b) Modification of existing emission unit(s); identify whether this is a significant modification;
 - (c) Modification of existing unit(s), unregistered.
- (4) If this project is subject to the requirements of the State Environmental Policy Act (SEPA) contained in chapter 197-11 WAC, provide the name of the lead agency, lead agency contact person, and their phone number.
- (5) Describe the chemical and physical processes upstream of the emission unit(s).
- (6) Describe the existing and proposed (as applicable) abatement technology. Describe the basis for the use of the proposed system. Include expected efficiency of each control device, and the annual average volumetric flow rate(s) in meters³/sec for the emission unit(s).
- (7) Provide conceptual drawings showing all applicable control technology components from the point of entry of radionuclides into the vapor space to release to the environment.
- (8) Identify each radionuclide that could contribute greater than ten percent of the potential-to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential-to-emit TEDE to the MEI.
- (9) Describe the effluent monitoring system for the proposed control system. Describe each piece of monitoring equipment and its monitoring capability, including detection limits, for each radionuclide that could contribute greater than ten percent of the potential-to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential-to-emit TEDE to the MEI, or greater than twenty-five percent of the TEDE to the MEI, after controls. Describe the method for monitoring or calculating those radionuclide emissions. Describe the method with detail sufficient to demonstrate compliance with the applicable requirements.
- (10) Indicate the annual possession quantity for each radionuclide.
- (11) Indicate the physical form of each radionuclide in inventory: Solid, particulate solids, liquid, or gas.
- (12) Indicate the release form of each radionuclide in inventory: Particulate solids, vapor, or gas. Give the chemical form and ICRP 30 solubility class, if known.
- (13) Release rates.
- (a) New emission unit(s): Give predicted release rates without any emissions control equipment (the potential-to-emit) and with the proposed control equipment using the efficiencies described in subsection (6) of this section.

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(b) Modified emission unit(s): Give predicted release rates without any emissions control equipment (the potential-to-emit) and with the existing and proposed control equipment using the efficiencies described in subsection (6) of this section. Provide the latest year's emissions data or emissions estimates.

In all cases, indicate whether the emission unit is operating in a batch or continuous mode.

(14) Identify the MEI by distance and direction from the emission unit(s). The MEI is determined by considering distance, windrose data, presence of vegetable gardens, and meat or milk producing animals at unrestricted areas surrounding the emission unit.

(15) Calculate the TEDE to the MEI using an approved procedure (see WAC 246-247-085). For each radionuclide identified in subsection (8) of this section, determine the TEDE to the MEI for existing and proposed emission controls, and without any emission controls (the potential-to-emit) using the release rates from subsection (13) of this section. Provide all input data used in the calculations.

(16) Provide cost factors for construction, operation, and maintenance of the proposed control technology components and system, if a BARCT or ALARACT demonstration is not submitted with the NOC.

(17) Provide an estimate of the lifetime for the facility process with the emission rates provided in this application.

(18) Indicate which of the following control technology standards have been considered and will be complied with in the design and operation of the emission unit(s) described in this application:

ASME/ANSI AG-1, Code on Nuclear Air and Gas Treatment (where there are conflicts in standards with the other listed references, this standard shall take precedence)

ASME/ANSI N509, Nuclear Power Plant Air-Cleaning Units and Components

ASME/ANSI N510, Testing of Nuclear Air Treatment Systems

ANSI/ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities 40 CFR 60, Appendix A, Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17

ANSI N13.1, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities

For each standard not so indicated, give reason(s) to support adequacy of the design and operation of the emission unit(s) as proposed.

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20.2.3 RCRA TSD Facility Permits

The 324 Building contains mixed waste units in the Radiochemical Engineering Cell and High Level Vault from past management activities. Part A permit applications were not filed for these units; plans concerning compliance and cleanout of the 324 Building were provided to Ecology. Per agreement between Ecology, DOE, and EPA, the 324 Building will be cleaned and closed pursuant to Tri-Party Agreement Milestone M-89.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 805(7) and (7)(a)

Changes during interim status.

(a) Except as provided in (b) of this subsection, the owner or operator of an interim status facility may make the following changes at the facility:

(i) Treatment, storage, or disposal of new dangerous wastes not previously identified in Part A of the permit application (and, in the case of newly listed or identified wastes, addition of the units being used to treat, store, or dispose of the dangerous wastes on the effective date of the listing or identification) if the owner or operator submits a revised Part A permit application prior to such treatment, storage, or disposal (along with a justification detailing the equipment and process or processes that the owner or operator will use to treat, store, or dispose of the new dangerous wastes) and if the department does not explicitly deny the changes within sixty days of receipt of the revised application;

(ii) Increases in the design capacity of processes used at the facility if the owner or operator submits a revised Part A permit application prior to such a change (along with a justification explaining the need for the change), the requirements of WAC 173-303-281 are met, and the department approves the changes because:

(A) There is a lack of available treatment, storage, or disposal capacity at other dangerous waste management facilities; or

(B) The change is necessary to comply with a federal, state, or local requirement.

(iii) Changes in the processes for the treatment, storage, or disposal of dangerous waste or addition of processes if the owner or operator submits a revised Part A permit application prior to such change (along with a justification explaining the need for the change) and the department approves the change because:

(A) The change is necessary to prevent a threat to human health and the environment because of an emergency situation; or

(B) The change is necessary to comply with a federal, state, or local requirement.

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(iv) Changes in the ownership or operational control of a facility if the new owner or operator submits a revised Part A permit application no later than ninety days prior to the scheduled change. When a transfer of operational control of a facility occurs, the old owner or operator must comply with the interim status financial requirements of 40 CFR Part 265, Subpart H (as referenced in WAC 173-303-400), until the new owner or operator has demonstrated to the department that he is complying with the financial requirements. Upon demonstration to the department by the new owner or operator of compliance with the interim status financial requirements, the department will notify the old owner or operator in writing that he no longer needs to comply with the interim status financial requirements as of the date of demonstration. The new owner or operator must demonstrate compliance with the financial requirements within six months of the date of the change in ownership or operational control of the facility. All other interim status duties are transferred effective immediately upon the date of the change in ownership or operational control of the facility.

(v) Changes made in accordance with an interim status corrective action order issued by EPA under section 3008(h) of RCRA or other federal authority, including an order or consent decree issued pursuant to WAC 173-303-646 (2) or (3), by the department under chapter 70.105 RCW or other state authority, or by a court in a judicial action brought by EPA or by the department. Changes under this subsection (7)(a)(v) are limited to the treatment, storage, or disposal of solid waste from releases that originate within the boundary of the facility.

(vi) Addition of newly regulated units for the treatment, storage, or disposal of dangerous waste if the owner or operator submits a revised Part A permit application on or before the date on which the unit becomes subject to the new requirements.

20.3 Environmental Monitoring, Surveillance and Inspections

This element includes the creation and implementation of monitoring, surveillance, and inspection plans and specific monitoring and surveillance methods designed to prevent, detect, and mitigate leaks, spills, discharges, etc. Examples include air quality surveillance standards, air and liquid effluent point source discharge monitoring, and hazardous waste site monitoring. WAC 173-303 provides the basis of the requirements which addresses dangerous waste leak detection, prevention, and mitigation.

20.3.1 Monitoring, Surveillance and Inspection Plans and Procedures

This subelement addresses the requirements for preparing monitoring, surveillance, and inspection plans and procedures. Monitoring plans describe the conduct of routine data collection programs designed to provide required environmental data. Inspection plans describe the conduct of periodic, routine inspections of facilities and equipment used to collect environmental data. Procedures provide the specific instructions for conducting activities under the monitoring, surveillance and inspection plans.

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REQUIREMENT SOURCE: 40 CFR 60, Section 13(e)

Except for system breakdowns, repairs, calibration checks, and zero and span adjustments required under paragraph (d) of this section, all continuous monitoring systems shall be in continuous operation and shall meet minimum frequency of operation requirements as follows:

- (1) All continuous monitoring systems referenced by paragraph (c) of this section for measuring opacity of emissions shall complete a minimum of one cycle of sampling and analyzing for each successive 10-second period and one cycle of data recording for each successive 6-minute period.
- (2) All continuous monitoring systems referenced by paragraph (c) of this section for measuring emissions, except opacity, shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.

REQUIREMENT SOURCE: DOE ORDER 5400.1, Revision C01, Chapter IV, Section 4

Environmental Monitoring Plans. A written environmental monitoring plan shall be prepared for each site, facility, or process that uses, generates, releases, or manages significant pollutants or hazardous materials. The plan shall contain the rationale and design criteria for the monitoring program, extent and frequency of monitoring and measurements, procedures for laboratory analyses, quality assurance requirements, program implementation procedures, and direction for the preparation and disposition of reports. The plan shall be approved by the appropriate Head of Field Organization, or his or her designee. The plan shall be reviewed annually and updated as needed. The plan shall identify and discuss two major activities: (a) effluent monitoring, and (b) environmental surveillance. The plan shall reflect the importance of monitoring as a critical element of an effective environmental protection program. The plan shall be reviewed annually and updated every 3 years.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter V, Section 3.a.(3)

Planning for facility decommissioning shall be initiated during the design phase for new facilities and prior to termination of operations for existing operational facilities. Such plans shall consider the 2-year budget cycle to assure adequate funding availability.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter V, Section 3.a.(5)

Responsibility for contaminated facilities may be transferred from one program organization to another by mutual agreement of the programs involved. 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. 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.

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REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 075(12)

All facilities must be able to demonstrate that appropriate supervisors and workers are adequately trained in the use and maintenance of emission control and monitoring systems, and in performance of associated test and emergency response procedures.

20.3.2 Effluent Monitoring

REQUIREMENT SOURCE: DOE ORDER 5400.1, Revision C01, Chapter IV, Section 5.a.(1)

Effluent monitoring shall be conducted at all DOE sites to satisfy the following program objectives:

- (a) Verify compliance with applicable Federal, State, and local effluent regulations and DOE Orders.
- (b) Determine compliance with commitments made in Environmental Impact Statements, Environmental Assessments, or other official documents.
- (c) Evaluate the effectiveness of effluent treatment and control.
- (d) Identify potential environmental problems and evaluate the need for remedial actions or mitigation measures.
- (e) Support permit revision and/or reissuance.
- (f) Detect, characterize, and report unplanned releases.

REQUIREMENT SOURCE: DOE ORDER 5400.1, Revision C01, Chapter IV, Section 5.b(2)

Environmental surveillance programs and components should be determined on a site-specific basis by the field organization. Programs should reflect facility characteristics, applicable regulations, hazard potential, quantities and concentrations of materials released, the extent and use of affected air, land, and water, and specific local public interest or concern. Surveillance programs are likely to include one or more of the following:

- (a) Monitoring stations;
- (b) Sampling and analysis; and
- (c) Monitoring data recordkeeping.

REQUIREMENT SOURCE: DOE ORDER 5484.1, Revision C07, Chapter III, Section 5.c(1)(a)

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As a general rule, monitoring should be conducted in a manner that provides accurate measurements of the quantity and concentration of liquid and airborne pollutants in effluents as a basis for:

- 1 Determining compliance with applicable discharge and effluent control limits, including self-imposed administrative limits designed to assure compliance with in-plant operating limits, effluent standards or guides, and with environmental standards or guides.
- 2 Evaluating the adequacy and effectiveness of containment and waste treatment and control as well as of efforts toward achieving levels of radioactivity which are as low as reasonably achievable considering technical and economical constraints.
- 3 Compiling an annual inventory of the radioactivity released in effluents and onsite discharges.

REQUIREMENT SOURCE: DOE ORDER 5484.1, Revision C07, Chapter III, Section 5.c(2)

Monitoring Locations. Measurements of volume, rate of discharge, content, etc., should be made, insofar as is practical, at the point at which the data most closely represent what is being released. This implies that measurements should be made at the point of discharge, though there are exceptions. Effluents should be monitored at the point at which the applicable standards apply. In the case of onsite discharges, the monitoring location may be the waste treatment or disposal system; and in case of effluents, the monitoring location may be the point of release to the offsite environment after all treatment and control, including retention and decay, have been effected. In many instances, the monitoring location is specified in a discharge or operating permit.

REQUIREMENT SOURCE: DOE ORDER 5484.1, Revision C07, Chapter III, Section 5.c(3)(a)

Sampling frequency and type should be determined by considering the purpose for which the data are being obtained, e.g., evaluation of the effectiveness of waste treatment and control, compliance with operating limits of applicable effluent or performance standards, compilation of release data, etc. Continuous sampling is desirable and may be necessary where there is wide variation in the concentrations or mixture of potential pollutants in the effluent stream. However, periodic sampling may suffice when the concentration and mixtures are reasonably constant and there is little likelihood of unusual variations. Similarly, proportional sampling may be necessary when effluent flow rates fluctuate, whereas a representative grab-sample may suffice for batch discharges. The method of sampling may be specified in the applicable regulation or permit.

REQUIREMENT SOURCE: DOE ORDER 5484.1, Revision C07, Chapter III, Section 5.c(3)(b)

For purposes of reporting radiological data, gross radioactivity measurements are generally inadequate. They are appropriate only:

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- 1 When gross radioactivity releases are a small fraction of the offsite Radioactivity Concentration Guides (RCG's) for "unidentified mixtures" and are of no health or environmental significance;
- 2 When the relative concentrations of specific radionuclides are so well known by other means that gross radioactivity measurements are truly indicative of the activity being released; or
- 3 When the activity of waste streams is so low as to preclude specific nuclide measurements.

20.3.3 Radiological Effluents

This subelement specifies the requirements for the facility to monitor radioactive effluents in air media and to perform an assessment of the potential radiation dose to members of the public resulting from facility operations.

REQUIREMENT SOURCE: 40 CFR 61, Dated 07-01-95, Part 93(a)

To determine compliance with the standard, radionuclide emissions shall be determined and effective dose equivalent values to members of the public calculated using EPA approved sampling procedures, computer models CAP-88 or AIRDOS-PC, or other procedures for which EPA has granted prior approval. DOE facilities for which the maximally exposed individual lives within 3 kilometers of all sources of emissions in the facility, may use EPA's COMPLY model and associated procedures for determining dose for purposes of compliance.

REQUIREMENT SOURCE: 40 CFR 61, Dated 07-01-95, Part 93(b)(5)

Environmental measurements of radionuclide air concentrations at critical receptor locations may be used as an alternative to air dispersion calculations in demonstrating compliance with the standard if the owner or operator meets the following criteria:

- (i) The air at the point of measurement shall be continuously sampled for collection of radionuclides.
- (ii) Those radionuclides released from the facility, which are the major contributors to the effective dose equivalent must be collected and measured as part of the environmental measurement program.
- (iii) Radionuclide concentrations which would cause an effective dose equivalent of 10% of the standard shall be readily detectable and distinguishable from background.
- (iv) Net measured radionuclide concentrations shall be compared to the concentration levels in Table 2 of appendix E to determine compliance with the standard. In the case of multiple radionuclides being released from a facility, compliance shall be demonstrated if the value for all radionuclides is less than the concentration level in Table 2, and the sum of the fractions that result

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when each measured concentration value is divided by the value in Table 2 for each radionuclide is less than 1.

(v) A quality assurance program shall be conducted that meets the performance requirements described in appendix B, Method 114.

(vi) Use of environmental measurements to demonstrate compliance with the standard is subject to prior approval of EPA. Applications for approval shall include a detailed description of the sampling and analytical methodology and show how the above criteria will be met.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter I, Section 3.b.(3)(a)

Monitoring and lead[SIC] detection capability shall be incorporated in the engineering systems (e.g., liquid level sensing devices and alarms for high-level waste liquid systems) to provide rapid identification of failed containment, and measurement of abnormal temperatures. The following, at a minimum, shall be monitored; temperature; pressure; radioactivity in ventilation exhaust; and liquid effluent streams associated with high-level waste facilities. Where the possibility exists for the generation of flammable and explosive mixtures of gases, monitoring shall be conducted. For facilities storing liquid high-level waste, the following should also be monitored: liquid levels; sludge volume; tank chemistry; condensate and cooling water.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter I, Section 3.b.(3)(b)

Leak detection systems (e.g., conductivity probes) 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter I, Section 3.b.(3)(c)

A method for periodically assessing waste storage system integrity (e.g., coupons for corrosion testing, photographic and periscopic inspections, leak detectors, liquid level devices) shall be established, documented, and reported as required in the Waste Management Plan.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter I, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter I, Section 3.b.(3)(e)

Surface water systems associated with the high-level waste storage area shall be monitored according to applicable National Pollution Discharge Elimination System permits and EM Order requirements.

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REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter I, Section 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.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter I, Section 3.c.(3)

Monitoring, Surveillance, and Leak Detection.

(a) Monitoring and surveillance capability shall exist to provide liquid volume, waste inventory data, and identification of failed containment.

(b) A method for periodically assessing waste storage tank integrity (e.g., coupons, photographic inspections, leak detectors, liquid level devices) shall be established and documented.

(c) Emergency power (see paragraph 3b(3)(d)).

(d) Monitoring wells (see paragraph 3b(3)(f)).

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.a.(2)

Assure that external exposure to the waste and concentrations of radioactive material which may be released into surface water, ground water, soil, plants and animals results in an effective dose equivalent that does not exceed 25 mrem/yr to any member of the public. Releases to the atmosphere shall meet the requirements of 40 CFR 61. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 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 3.k.(2) through 3.k.(4).

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 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.

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REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.k.(3)

Based on 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, water, both in the saturated and unsaturated zones.

REQUIREMENT SOURCE: DOE ORDER 5820.2A, Chapter III, Section 3.k.(4)

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. 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.

REQUIREMENT SOURCE: WAC 173-480, Dated 05-07-86, Section 070

(1) The procedures specified in chapter 402-80 WAC shall be used to determine compliance with the standard. Radionuclide emissions shall be determined and dose equivalents to members of the public shall be calculated using department of social and health services approved sampling procedures, department of social and health services approved models, or other procedures, including those based on environmental measurements that department of social and health services has determined to be suitable.

(2) Compliance with this standard shall be determined by calculating the dose to members of the public at the point of maximum annual air concentration in an unrestricted area where any member of the public may be.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 075(2)

Equipment and procedures used for the continuous monitoring of radioactive air emissions shall conform, as applicable, to the guidance contained in ANSI N13.1, ANSI N42.18, ANSI N317, reference methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17 of 40 CFR Part 60, Appendix A, 40 CFR Part 52, Appendix E, and any other methods approved by the department.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 075(3)

The operator of an emission unit with a potential-to-emit of less than 0.1 mrem/yr TEDE to the MEI may estimate those radionuclide emissions, in lieu of monitoring, in accordance with 40 CFR 61 Appendix D, or other procedure approved by the department. The department may require periodic confirmatory measurements (e.g., grab samples) during routine operations to verify the low emissions. Methods to implement periodic confirmatory monitoring shall be approved by the department.

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REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 075(8)

Facilities shall monitor nonpoint and fugitive emissions of radioactive material.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 075(13)

All facilities must be able to demonstrate the reliability and accuracy of the radioactive air emissions monitoring data.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 080(9)

The facility shall ensure all emission units are fully accessible to department inspectors. In the event the hazard associated with accessibility to a unit require training and/or restrictions or requirements for entry, the facility owner and operator shall inform the department, prior to arrival, to those restrictions or requirements. The owner or operator shall be responsible for providing the necessary training escorts, and support services to allow the department to inspect the facility.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 085(1)

All procedures for determining compliance with the dose equivalent standards of 40 CFR 61, Subparts H and I published in the Federal Register on December 15, 1989, are adopted by reference, as applicable as specified by the referenced subparts.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 085(2)

Facilities subject to 40 CFR 61 shall use computer codes or procedures approved by the EPA to determine the TEDE to the MEI; all other facilities shall use computer codes or procedures approved by the department.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 085(3)

The determination of compliance with the dose equivalent standard of WAC 246-247-040 shall include all radioactive air emissions resulting from routine and nonroutine operations for the past calendar year.

20.3.4 Tank Systems

This subelement includes the requirements for monitoring, inspection, and surveillance of tank systems.

20.3.4.1 Dangerous Waste

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REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 320(1)

The owner or operator must inspect his facility to prevent malfunctions and deterioration, operator errors, and discharges which may cause or lead to the release of dangerous waste constituents to the environment, or a threat to human health. The owner or operator must conduct these inspections often enough to identify problems in time to correct them before they harm human health or the environment.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 320(2)

The owner or operator must develop and follow a written schedule for inspecting all monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment that help prevent, detect, or respond to hazards to the public health or the environment. In addition:

- (a) He must keep the schedule at the facility;
- (b) The schedule must identify the types of problems which are to be looked for during inspections;
- (c) The schedule must indicate the frequency of inspection for specific items. The frequency should be based on the rate of possible deterioration of equipment, and the probability of an environmental or human health incident. Areas subject to spills must be inspected daily when in use. At a minimum the inspection schedule must also include the applicable items and frequencies required for the specific waste management methods described in 40 CFR Part 265 Subparts F through R, 265.1033, 265.1052, 265.1053, and 265.1058, for interim status facilities and in WAC 173-303-630 through 173-303-680, and 40 CFR 264.1033, 264.1052, 264.1053, and 264.1058 for final status facilities; and
- (d) The owner or operator must keep an inspection log or summary, including at least the date and time of the inspection, the printed name and the handwritten signature of the inspector, a notation of the observations made, an account of spills or discharges in accordance with WAC 173-303-145, and the date and nature of any repairs or remedial actions taken. The log or summary must be kept at the facility for at least five years from the date of inspection.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 320(3)

The owner or operator must remedy any problems revealed by the inspection, on a schedule which prevents hazards to the public health and environment. Where a hazard is imminent or has already occurred, remedial action must be taken immediately.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(6) and (6)(a)

Inspections.

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(a) The owner or operator must develop and follow a schedule and procedure for inspecting overfill controls.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(6)(b)

The owner or operator must inspect at least once each operating day:

- (i) Aboveground portions of the tank system, if any, to detect corrosion or releases of waste;
- (ii) Data gathered from monitoring any leak detection equipment (e.g., pressure or temperature gauges, monitoring wells) to ensure that the tank system is being operated according to its design; and
- (iii) The construction materials and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system (e.g., dikes) to detect erosion or signs of releases of dangerous waste (e.g., wet spots, dead vegetation).

Note: WAC 173-303-320 requires the owner or operator to remedy any deterioration or malfunction he finds. Subsection (7) of this section requires the owner or operator to notify the department within twenty-four hours of confirming a leak. Also, 40 CFR Part 302 may require the owner or operator to notify the National Response Center of a release.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(6)(c)

The owner or operator must inspect cathodic protection systems, if present, according to, at a minimum, the following schedule to ensure that they are functioning properly:

- (i) The proper operation of the cathodic protection system must be confirmed within six months after initial installation and annually thereafter; and
- (ii) All sources of impressed current must be inspected and/or tested, as appropriate, at least bimonthly (i.e., every other month).

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 640(6)(d)

The owner or operator must document in the operating record of the facility an inspection of those items in (a) through (c) of this subsection. The owner or operator must keep an inspection log including at least the date and time of the inspection, the printed name and the handwritten signature of the inspector, a notation of the observations made and the date and nature of any repairs or remedial actions taken. The log must be kept at the facility for at least five years from the date of inspection.

20.3.4.2 Underground Storage Tanks

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REQUIREMENT SOURCE: WAC 173-360, Dated 03-04-95, Section 350(1)

Any method of release detection for piping shall meet the performance requirements of this section, with any performance claims and their manner of determination described in writing by the equipment manufacturer or installer. In addition, release detection methods, except for those methods permanently installed prior to December 22, 1990, shall be capable of detecting the leak rate or quantity specified for that method in subsection (3)(a) and (b) of this section with a probability of detection of 0.95 and a probability of false alarm of 0.05. (That is, under test conditions, a method will correctly detect at least ninety-five of one hundred actual releases, and will falsely indicate a release no more than five times in one hundred tests of nonleaking systems.)

Note: The establishment of leak indication thresholds is a means of setting a standard for the equipment or method used. It is not in any way meant to imply that actual leak rates less than these limits are allowable. No release is acceptable, and any indication that a release may have occurred should be investigated in accordance with WAC 173-360-360.

REQUIREMENT SOURCE: WAC 173-360, Dated 03-04-95, Section 370 Introduction and (1)

Unless corrective action is initiated in accordance with WAC 173-360-399, owners and operators shall immediately investigate and confirm all suspected releases of regulated substances requiring reporting under WAC 173-360-360 within seven days of discovery, or another reasonable time period specified by the department or delegated agency, using either the following steps or another procedure approved by the department or delegated agency:

(1) System test. Owners and operators shall have tests conducted (according to the requirements for tightness testing in WAC 173-360-345 (6)(d) and 173-360-350 (3)(b)) that determine whether a leak exists in any portions of the UST system that routinely contains a regulated substance, including the tank and the attached delivery piping, and in any connected tanks and piping that may or may not be in use. All such portions shall be tested either separately or together or in combinations thereof.

(a) Owners and operators shall have their system repaired, replaced, upgraded or closed by a certified UST supervisor and shall begin corrective action in accordance with WAC 173-360-399 if the test results for the system, tank, or delivery piping indicate that a leak exists.

(b) Further investigation is not required if the test results for the system, tank, and delivery piping do not indicate that a leak exists and if environmental contamination is not the basis for suspecting a release.

(c) Owners and operators shall conduct a site check in accordance with subsection (2) of this section if the test results for the system, tank, and delivery piping do not indicate that a leak exists but environmental contamination is the basis for suspecting a release.

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20.3.5 Quality Assurance

REQUIREMENT SOURCE: DOE ORDER 5400.1, Revision C01, Chapter IV, Section 10.a

Author's Note: DOE Order 5700.6B has been superseded by DOE Order 5700.6C.

Quality Assurance and Data Verification - Quality Assurance. 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. The quality assurance program shall include, but not be limited to, the following:

- (1) Organizational responsibility;
- (2) Program design;
- (3) Procedures;
- (4) Field quality control;
- (5) Laboratory quality control;
- (6) Human factors;
- (7) Recordkeeping;
- (8) Chain-of-custody procedures;
- (9) Audits;
- (10) Performance reporting; and
- (11) Independent data verification.

REQUIREMENT SOURCE: TRIPARTY AGREEMENT, Revision 6, Attachment 2, Section 6.5, Paragraph 1

The level of quality assurance and quality control (QA/QC) for the collection, preservation, transportation, and analysis of each sample which is required for implementation of this Agreement shall be dependent upon the data quality objectives for the sample. Such data quality objectives shall be specified in RCRA closure plans, the RCRA permit, and any other relevant plans that may be used to describe sampling and analyses at RCRA TSD units.

REQUIREMENT SOURCE: TRIPARTY AGREEMENT, Revision 6, Attachment 2, Section 6.5, Paragraph 2

The QA/QC requirements shall range from those necessary for non-laboratory field screening activities to those necessary to support a comprehensive laboratory analysis that will be used in final decision-making. This range of QA/QC options is included in the "Data Quality Strategy for Hanford Site Characterization" (as listed in Appendix F). This document is subject to approval by EPA and Ecology.

REQUIREMENT SOURCE: TRIPARTY AGREEMENT, Revision 6, Attachment 2, Section 6.5, Paragraph 3

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Based upon the data quality objectives, the DOE shall comply with EPA guidance documents for QA/QC and sampling and analysis activities which are taken to implement the Agreement. Such guidance includes:

- "Guidelines and Specifications for Preparing Quality Assurance Program Plans" (QAMS-004/80);
- "Interim Guidance and Specifications for Preparing Quality Assurance Project Plans" (QAMS-005/80);
- "Data Quality Objectives for Remedial Response Activities" (EPA/540/G-87/003 and 004); and
- "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA/SW-846).

REQUIREMENT SOURCE: TRIPARTY AGREEMENT, Revision 6, Attachment 2, Section 6.5, Paragraph 4

In some instances, RCRA TSD units are included in operable units and are scheduled for investigation and closure as part of the operable unit remedial action. DOE shall follow the provisions of Section 7.8 for QA/QC for sampling and analysis activities at these land disposal units.

REQUIREMENT SOURCE: TRIPARTY AGREEMENT, Revision 6, Attachment 2, Section 6.5, Paragraph 6

For analytical chemistry and radiological laboratories, the QA/QC plans must include the elements listed in "Guidance on Preparation of Laboratory Quality Assurance Plans" (as listed in Appendix F). DOE shall submit laboratory QA/QC plans to the lead regulatory agency for review as secondary documents prior to use of that laboratory. In the event that DOE fails to demonstrate to the lead regulatory agency that data generated pursuant to this Agreement was obtained in accordance with the QA/QC requirements of this section, including laboratory QA/QC plans, DOE shall repeat sampling or analysis as required by the lead regulatory agency. Such action by the lead regulatory agency shall not preclude any other action which may be taken pursuant to this Agreement. For other data, the lead regulatory agency may request DOE to provide QA/QC documentation. Any such data that does not meet the QA/QC standard required by this section shall be clearly flagged and noted to indicate this fact.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 075(6)

Licensed facilities shall conduct and document a quality assurance program. Except for those types of facilities specified in subsection (5) of this section, the quality assurance program shall be compatible with applicable national standards such as ANSI/ASME NQA-1-1988, ANSI/ASME NQA-2-1986, QAMS-004, and QAMS-005.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 075(7)

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Those types of facilities specified in subsection (5) of this section shall conduct and document a quality assurance program compatible with either the applicable national standards referenced in subsection (6) of this section or the NRC's Regulatory Guide 4.15, dated February 1979.

20.4 Environmental Control Standards

Environmental Control Standards are media and application - specific limits established for air emission sources and waste management activities.

REQUIREMENT SOURCE: DOE ORDER 5400.1, Revision C01, Chapter IV, Section 7.a

Radiological Monitoring - Requirements for the environmental monitoring of radioactive materials are to be found in DOE Orders in the 5400 series dealing with radiation protection of the public and the environment. 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." Further, for those radioactive materials not regulated under the Clean Air Act, DOE has established standards to meet its responsibilities under the Atomic Energy Act.

REQUIREMENT SOURCE: DOE ORDER 5400.1, Revision C01, Chapter IV, Section 7.b

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. Assessments shall be made in accordance with the requirements of DOE Orders in the 5400 series dealing with radiation protection of the public and the environment.

REQUIREMENT SOURCE: TRIPARTY AGREEMENT, Revision 6, Attachment 2, Section 6.3, Paragraphs 1 and 2

TREATMENT, STORAGE, AND DISPOSAL CLOSURE PROCESS

The DOE will follow applicable Federal and State statutes, regulations and guidance documents, and written policy determinations that pertain to the closure process for TSD groups/units.

The TSD units containing mixed waste will normally be closed with consideration of all hazardous substances, which includes radioactive constituents. Hazardous substances not addressed as part of the TSD closure may be addressed under CERCLA past-practice (CPP) authority in accordance with the process defined in Section 7.0.

REQUIREMENT SOURCE: TRIPARTY AGREEMENT, Revision 6, Attachment 2, Section 6.3.1

Clean Closure

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In some cases, it may be possible to remove all hazardous wastes and constituents associated with a TSD unit and thereby achieve "clean closure." The process to complete clean closure of any unit will be carried out in accordance with all applicable requirements described in 173-303 WAC and 40 CFR 270.1. Any demonstration for clean closure of a disposal unit, or selected treatment or storage units as determined by the lead regulatory agency, must include documentation that groundwater and soils have not been adversely impacted by that TSD group/unit, as described in 173-303-645 WAC.

After completion of clean closure activities, a closed storage unit may be reused for generator accumulation (less than 90 day storage).

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 400(3) and (3)(a)

Standards.

(a) Interim status standards are the standards set forth by the Environmental Protection Agency in 40 CFR Part 265 Subparts F through R, Subpart W, and Subparts AA, BB, and DD which are incorporated by reference into this regulation (including, by reference, any EPA requirements specified in those subparts which are not otherwise explicitly described in this chapter), and:

(i) The land disposal restrictions of WAC 173-303-140; the facility requirements of WAC 173-303-280 through 173-303-440; and the corrective action requirements of WAC 173-303-646(2);

(ii) WAC 173-303-630(3), for containers. In addition, for container storage, the department may require that the storage area include secondary containment in accordance with WAC 173-303-630(7), if the department determines that there is a potential threat to public health or the environment due to the nature of the wastes being stored, or due to a history of spills or releases from stored containers. Any new container storage areas constructed or installed after September 30, 1986, must comply with the provisions of WAC 173-303-630(7).

(iii) WAC 173-303-640 (5)(d), for tanks; and

(iv) WAC 173-303-805.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 400(3)(b)

For purposes of applying the interim status standards of 40 CFR Part 265 Subparts F through R, Subpart W, and Subparts AA, BB, and DD to the state of Washington facilities, the federal terms have (and in the case of the wording used in the financial instruments referenced in Subpart H of Part 265, must be replaced with) the following state of Washington meanings:

(i) "Regional administrator" means the "department" except for 40 CFR Parts 270.2; 270.3; 270.5;

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270.10(e)(1),(2) and (4); 270.10(f) and (g); 270.11(a)(3); 270.14(b)(20); 270.32(b)(2); and 270.51;

(ii) "Hazardous" means "dangerous";

(iii) "Compliance procedure" has the meaning set forth in WAC 173-303-040, Definitions;

(iv) "EPA hazardous waste numbers" mean "dangerous waste numbers".

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 400(3)(c)

In addition to the changes described in (b) of this subsection, the following modifications are made to interim status standards of 40 CFR Part 265 Subparts F through R, Subpart W, and Subparts AA, BB, and DD:

(i) The words "the effective date of these regulations" means:

(A) November 19, 1980, for facilities which manage any wastes designated by 40 CFR Part 261;

(B) For wastes which become designated by 40 CFR Part 261 subsequent to November 19, 1980, the effective date is the date on which the wastes become regulated;

(C) March 12, 1982, for facilities which manage wastes designated only by WAC 173-303-080 through 173-303-100 and not designated by 40 CFR Part 261;

(D) For wastes which become designated only by WAC 173-303-080 through 173-303-100 and not designated by 40 CFR Part 261 subsequent to March 12, 1982, the effective date is the date on which the wastes become regulated.

(ii) "Subpart N - landfills" has an additional section added which reads: "An owner/operator must not landfill an organic carcinogen or an EHW, as defined by WAC 173-303-080 through 173-303-100, except at the EHW facility at Hanford";

(iii) "Subpart R - underground injection" has an additional section which reads: "Owners and operators of wells are prohibited from disposing of EHW or an organic carcinogen designated under WAC 173-303-080 through 173-303-100";

(iv) "Subpart M - land treatment," section 265.273(b) is modified to replace the words "Part 261, Subpart D of this chapter" with "WAC 173-303-080";

(v) "Subpart F - ground water monitoring," section 265.91(c) includes the requirement that: "Groundwater monitoring wells must be designed, constructed, and operated so as to prevent groundwater contamination. Chapter 173-160 WAC may be used as guidance in the installation of wells";

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(vi) "Subpart H - financial requirements" has an additional section which reads: "Any owner or operator who can provide financial assurances and instruments which satisfy the requirements of WAC 173-303-620 will be deemed to be in compliance with 40 CFR Part 265 Subpart H". In 40 CFR Parts 265.143(g) and 265.145(g) the following sentence does not apply to the state: "If the facilities covered by the mechanisms are in more than one Region, identical evidence of financial assurance must be submitted to, and maintained with the Regional Administrators of all such Regions." In addition, the following sections and any cross-reference to these sections are not incorporated by reference: 40 CFR Parts 265.149 and 265.150; and

(vii) "Subpart J - tank systems" section 265.193(a) is modified so that the dates by which secondary containment (which meets the requirements of that section) must be provided are the same as the dates in WAC 173-303-640 (4)(a).

(viii) "Subpart J - tank systems" section 265.191(a) is modified so that the date by which an assessment of a tank system's integrity must be completed is January 12, 1990.

(ix) "Subpart G - closure and post-closure" section 265.115 is modified to read "Within 60 days of completion of closure of each dangerous waste management unit (including tank systems and container storage areas) and within 60 days of completion of final closure..." In addition, the clean-up levels for removal or decontamination set forth at WAC 173-303-610 (2)(b) apply.

(x) "Subpart B - general facility standards. References to "EPA" (etc.), means the "department" except at 40 CFR 265.11. Additionally, references to "administrator" (etc.), means the "director" except at 40 CFR 265.12(a)."

(xi) The following sections and any cross-reference to these sections are not incorporated or adopted by reference:

(A) 40 CFR Parts 260.1 (b)(4)-(6) and 260.20-22.

(B) 40 CFR Parts 264.1 (d) and (f); 265.1 (c)(4); 264.149-150 and 265.149-150; 264.301(k); and 265.430.

(C) 40 CFR Parts 268.5 and 6; 268 Subpart B; 268.42(b); and 268.44.

(D) 40 CFR Parts 270.1 (c)(1)(i); 270.60(b); and 270.64.

(E) 40 CFR Parts 124.1 (b)-(e); 124.4; 124.5(e); 124.9; 124.10 (a)(1)(iv); 124.12(e); 124.14(d); 124.15 (b)(2); 124.16; 124.17(b); 124.18; 124.19; and 124.21.

(F) 40 CFR Parts 2.106(b); 2.202(b); 2.205(i); 2.209 (b)-(c); 2.212-213; and 2.301-311.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 610(2) and (2)(a)

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Closure performance standard. The owner or operator must close the facility in a manner that:

- (a)(i) Minimizes the need for further maintenance;
- (ii) Controls, minimizes or eliminates to the extent necessary to protect human health and the environment, postclosure escape of dangerous waste, dangerous constituents, leachate, contaminated run-off, or dangerous waste decomposition products to the ground, surface water, ground water, or the atmosphere; and
- (iii) Returns the land to the appearance and use of surrounding land areas to the degree possible given the nature of the previous dangerous waste activity.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 610(2)(b)

Where the closure requirements of this section, or of WAC 173-303-630(10), 173-303-640(8), 173-303-650(6), 173-303-655(6), 173-303-655(8), 173-303-660(9), 173-303-665(6), 173-303-670(8), 173-303-680 (2) through (4), or 40 CFR 264.1102 (incorporated by reference at WAC 173-303-695) call for the removal or decontamination of dangerous wastes, waste residues, or equipment, bases, liners, soils or other materials containing or contaminated with dangerous wastes or waste residue, then such removal or decontamination must assure that the levels of dangerous waste or dangerous waste constituents or residues do not exceed:

- (i) For soils, ground water, surface water, and air, the numeric cleanup levels calculated using residential exposure assumptions according to the Model Toxics Control Act Regulations, chapter 173-340 WAC as now or hereafter amended. Primarily, these will be numeric cleanup levels calculated according to MTCA Method B, although MTCA Method A may be used as appropriate, see WAC 173-340-700 through 173-340-760, excluding WAC 173-340-745; and
- (ii) For all structures, equipment, bases, liners, etc., clean closure standards will be set by the department on a case-by-case basis in accordance with the closure performance standards of WAC 173-303-610 (2)(a)(ii) and in a manner that minimizes or eliminates post-closure escape of dangerous waste constituents.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 610(5)

Disposal or decontamination of equipment, structures and soils. During the partial and final closure periods, all contaminated equipment, structures and soils must be properly disposed of or decontaminated unless otherwise specified in WAC 173-303-640(8), 173-303-650(6), 173-303-655(8), 173-303-660(9), 173-303-665(6), or under the authority of WAC 173-303-680 (2) and (4). By removing any dangerous wastes or dangerous constituents during partial and final closure, the owner or operator may become a generator of dangerous waste and must handle that waste in accordance with all applicable requirements of WAC 173-303-170 through 173-303-230.

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20.4.1 Water Quality

REQUIREMENT SOURCE: WAC 173-200, Dated 01-31-95, Section 100(2)

No person shall engage in any activity that violates or causes the violation of this chapter.

20.4.2 Air Quality

This subelement specifies the standards for protection of the environment from emission of particulates, criteria pollutants, and toxic chemicals to the atmosphere.

REQUIREMENT SOURCE: DOE ORDER 5400.1, Revision C01, Chapter IV, Section 8.a(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.). Section 118 of the Act specifically addresses the control of airborne pollution from federal facilities. Design of air quality monitoring programs should be undertaken with a thorough understanding of the complex framework of air quality management.

REQUIREMENT SOURCE: DOE ORDER 5400.1, Revision C01, Chapter IV, Section 8.a(2)

Where applicable, DOE facilities shall comply with monitoring requirements discussed in 40 CFR Part 60, which includes monitoring of fossil fuel combustion sources and associated test methods. Appendix A of 40 CFR Part 60 provides methods referred to in 40 CFR Part 60.8 (Performance Tests) and 40 CFR Part 60.11 (Compliance with Standards and Maintenance Requirements).

REQUIREMENT SOURCE: NWP 95-300/324 LAB, Approval Conditions, 1.

Opacity from these two stacks shall not exceed five percent as measured by EPA Method 9 of CFR Part 60, Appendix A.

REQUIREMENT SOURCE: NWP 95-300/324 LAB, Approval Conditions, 2.

Volatile organic compounds (VOCs) at the stacks shall not exceed 110 grams per hour. Energy shall demonstrate initial compliance for VOC through source tests conducted not later than 180 days after start-up of full operation. EPA Method 25 or 25A shall be followed for testing. A test plan will be submitted for the department's approval at least 30 days prior to the testing. The department shall be invited to participate in this test activity at least one week before the test.

REQUIREMENT SOURCE: WAC 173-400, Dated 09-13-96, Section 040

General standards for maximum emissions.
All sources and emissions units are required to meet the emission standards of this chapter. Where

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an emission standard listed in another chapter is applicable to a specific emissions unit, such standard will take precedent over a general emission standard listed in this chapter. When two or more emissions units are connected to a common stack and the operator elects not to provide the means or facilities to sample emissions from the individual emissions units, and the relative contributions of the individual emissions units to the common discharge are not readily distinguishable, then the emissions of the common stack must meet the most restrictive standard of any of the connected emissions units. Further, all emissions units are required to use reasonably available control technology (RACT) which may be determined for some sources or source categories to be more stringent than the applicable emission limitations of any chapter of Title 173 WAC. Where current controls are determined to be less than RACT, ecology or the authority shall, as provided in section 8, chapter 252, Laws of 1993, define RACT for each source or source category and issue a rule or regulatory order requiring the installation of RACT.

REQUIREMENT SOURCE: WAC 173-400, Dated 09-13-96, Section 040(1)

Visible emissions. No person shall cause or permit the emission for more than three minutes, in any one hour, of an air contaminant from any emissions unit which at the emission point, or within a reasonable distance of the emission point, exceeds twenty percent opacity except:

(a) When the emissions occur due to soot blowing/grate cleaning and the operator can demonstrate that the emissions will not exceed twenty percent opacity for more than fifteen minutes in any eight consecutive hours. The intent of this provision is to permit the soot blowing and grate cleaning necessary to the operation of boiler facilities. This practice, except for testing and trouble shooting, is to be scheduled for the same approximate times each day and ecology or the authority be advised of the schedule.

(b) When the owner or operator of a source supplies valid data to show that the presence of uncombined water is the only reason for the opacity to exceed twenty percent.

(c) When two or more sources are connected to a common stack, ecology or the authority may allow or require the use of an alternate time period if it is more representative of normal operations.

(d) When an alternate opacity limit has been established per RCW 70.94.331 (2)(c).

REQUIREMENT SOURCE: WAC 173-400, Dated 09-13-96, Section 040(2)

Fallout. No person shall cause or permit the emission of particulate matter from any source to be deposited beyond the property under direct control of the owner(s) or operator(s) of the source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited.

REQUIREMENT SOURCE: WAC 173-400, Dated 09-13-96, Section 040(3)

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Fugitive emissions. The owner or operator of any emissions unit engaging in materials handling, construction, demolition or any other operation which is a source of fugitive emission:

(a) If located in an attainment area and not impacting any nonattainment area, shall take reasonable precautions to prevent the release of air contaminants from the operation.

(b) If the emissions unit has been identified as a significant contributor to the nonattainment status of a designated nonattainment area, shall be required to use reasonable and available control methods, which shall include any necessary changes in technology, process, or other control strategies to control emissions of the contaminants for which nonattainment has been designated.

REQUIREMENT SOURCE: WAC 173-400, Dated 09-13-96, Section 040(4)

Odors. Any person who shall cause or allow the generation of any odor from any source which may unreasonably interfere with any other property owner's use and enjoyment of his property must use recognized good practice and procedures to reduce these odors to a reasonable minimum.

REQUIREMENT SOURCE: WAC 173-400, Dated 09-13-96, Section 040(5)

Emissions detrimental to persons or property. No person shall cause or permit the emission of any air contaminant from any source if it is detrimental to the health, safety, or welfare of any person, or causes damage to property or business.

REQUIREMENT SOURCE: WAC 173-400, Dated 09-13-96, Section 040(7)

Concealment and masking. No person shall cause or permit the installation or use of any means which conceals or masks an emission of an air contaminant which would otherwise violate any provisions of this chapter.

REQUIREMENT SOURCE: WAC 173-400, Dated 09-13-96, Section 040(8)

Fugitive dust sources.

(a) The owner or operator of a source of fugitive dust shall take reasonable precautions to prevent fugitive dust from becoming airborne and shall maintain and operate the source to minimize emissions.

(b) The owner(s) or operator(s) of any existing source(s) of fugitive dust that has been identified as a significant contributor to a PM-10 nonattainment area shall be required to use reasonably available control technology to control emissions. Significance will be determined by the criteria found in WAC 173-400-113(3).

20.4.3 Radiological Effluents

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This subelement specifies the control for emissions of gaseous radiological effluents. Guidance for monitoring of these effluents is specified in DOE/EH-0173T and the WAC.

REQUIREMENT SOURCE: 40 CFR 61, Dated 07-01-95, Part 92

Standard.

Emissions of radionuclides to the ambient air from Department of Energy facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr.

REQUIREMENT SOURCE: 40 CFR 61, Dated 07-01-95, Part 93(b) Intro & (1)-(2)

Radionuclide emission rates from point sources (stacks or vents) shall be measured in accordance with the following requirements or other procedures for which EPA has granted prior approval:

(1) Effluent flow rate measurements shall be made using the following methods:

(i) Reference Method 2 of appendix A to part 60 shall be used to determine velocity and volumetric flow rates for stacks and large vents.

(ii) Reference Method 2A of appendix A to part 60 shall be used to measure flow rates through pipes and small vents.

(iii) The frequency of the flow rate measurements shall depend upon the variability of the effluent flow rate. For variable flow rates, continuous or frequent flow rate measurements shall be made. For relatively constant flow rates only periodic measurements are necessary.

(2) Radionuclides shall be directly monitored or extracted, collected and measured using the following methods:

(i) Reference Method 1 of appendix A part 60 shall be used to select monitoring or sampling sites.

(ii) The effluent stream shall be directly monitored continuously with an in-line detector or representative samples of the effluent stream shall be withdrawn continuously from the sampling site following the guidance presented in ANSIN13.1-1969 "Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities" (including the guidance presented in appendix A of ANSIN13.1) (incorporated by reference-see §167; 61.18). The requirements for continuous sampling are applicable to batch processes when the unit is in operation. Periodic sampling (grab samples) may be used only with EPA's prior approval. Such approval may be granted in cases where continuous sampling is not practical and radionuclide emission rates are relatively constant. In such cases, grab samples shall be collected with sufficient frequency so as to provide a representative sample of the emissions.

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(iii) Radionuclides shall be collected and measured using procedures based on the principles of measurement described in appendix B, Method 114. Use of methods based on principles of measurement different from those described in appendix B, Method 114 must have prior approval from the Administrator. EPA reserves the right to approve measurement procedures.

(iv) A quality assurance program shall be conducted that meets the performance requirements described in appendix B, Method 114.

REQUIREMENT SOURCE: 40 CFR 61, Dated 07-01-95, Part 93(b)(3)

When it is impractical to measure the effluent flow rate at an existing source in accordance with the requirements of paragraph (b)(1) of this section or to monitor or sample an effluent stream at an existing source in accordance with the site selection and sample extraction requirements of paragraph (b)(2) of this section, the facility owner or operator may use alternative effluent flow rate measurement procedures or site selection and sample extraction procedures provided that:

- (i) It can be shown that the requirements of paragraph (b) (1) or (2) of this section are impractical for the effluent stream.
- (ii) The alternative procedure will not significantly underestimate the emissions.
- (iii) The alternative procedure is fully documented.
- (iv) The owner or operator has received prior approval from EPA.

REQUIREMENT SOURCE: 40 CFR 61, Dated 07-01-95, Part 93(b)(4)

(i) Radionuclide emission measurements in conformance with the requirements of paragraph (b) of this section shall be made at all release points which have a potential to discharge radionuclides into the air in quantities which could cause an effective dose equivalent in excess of 1% of the standard. All radionuclides which could contribute greater than 10% of the potential effective dose equivalent for a release point shall be measured. With prior EPA approval, DOE may determine these emissions through alternative procedures. For other release points which have a potential to release radionuclides into the air, periodic confirmatory measurements shall be made to verify the low emissions.

(ii) To determine whether a release point is subject to the emission measurement requirements of paragraph (b) of this section, it is necessary to evaluate the potential for radionuclide emissions for that release point. In evaluating the potential of a release point to discharge radionuclides into the air for the purposes of this section, the estimated radionuclide release rates shall be based on the discharge of the effluent stream that would result if all pollution control equipment did not exist, but the facilities operations were otherwise normal.

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REQUIREMENT SOURCE: DOE ORDER 5400.1, Revision C01, Chapter IV, Section 5.a.(2)

Author's Note: DOE Order 5700.6B has been superseded by DOE Order 5700.6C.

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.

(a) Monitoring Stations. Effluents from on-site waste treatment or disposal systems shall be monitored in accordance with applicable regulations. Influent to on-site waste treatment or disposal systems should be monitored as needed.

(b) Sampling. Sample collection programs shall reflect specific facility needs. Type and frequency of sampling shall be adequate to characterize effluent streams.

(c) Sample Analysis. Standard analyses shall be used to analyze samples whenever such methods are required by regulatory programs. Exemptions due to analytical problems or for non-routine analyses may be employed after receiving approval from the appropriate regulatory agency. Analyses not required by regulations may be conducted as determined by site-specific conditions.

(d) Monitoring Data Record keeping. Auditable records shall be established in accordance with the requirements of DOE 5700.6B.

REQUIREMENT SOURCE: DOE ORDER 5400.5, Revision C02, Chapter II, Section 1.b

Airborne Emissions Only, All DOE Sources of Radionuclides. 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). Exposures to, and releases of, radon-220, radon-222, and their respective decay products are subject to DOE limits (See Figure III-3 and paragraphs IV.4b and IV.6).

(1) Title 40 CFR Part 61. The public dose limits as outlined in paragraph II.1b are established by EPA regulation 40 CFR Part 61, Subpart H, under the authority of the Clean Air Act. These limits apply offsite where the members of the public reside or abide. Subparts Q and T provide radon flux limits for DOE radium storage and disposal facilities (Chapter IV) and DOE inactive uranium mill tailings sites regulated under 40 CFR Part 192.

(2) AIRDOS/RADISK Codes. 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/RADISK known as CAP-88 or, when available and approved, AIRDOS-PC. Other computer codes or models, such as "Comply Code," which are specifically approved in accordance with 40 CFR Part 61, may also be used.

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(3) Environmental Measurements. Compliance may also be demonstrated through environmental or effluent measurements using EPA-approved techniques. In this case, the doses estimated are to individuals in areas offsite, where they are assumed to reside at the point of maximum annual air concentration.

REQUIREMENT SOURCE: DOE ORDER 5400.5, Revision C02, Chapter II, Section 6.b(2)

Dose Conversion Factors. Except as provided in Chapter II, 6.b.(2)(d), tables of approved dose conversion factors in Chapter II, 6.b.(2)(a), (b), and (c), below, shall be used to evaluate doses unless otherwise legally required, e.g., use of AIRDOS/RADRISK codes pursuant to 40 CFR Part 61, Subpart H.

REQUIREMENT SOURCE: DOE ORDER 5400.5, Revision C02, Chapter II, Section 6.b(2)(a)

Committed Dose Conversion Factors. Radionuclides taken into the body, generally by exposure modes whereby the radionuclide is ingested or inhaled, will continue to irradiate the body as long as they exist and are retained by the body. 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." These conversion factors are based upon the ICRP reference man model, and the committed dose is the dose integrated over an interval of 50 years.

REQUIREMENT SOURCE: DOE ORDER 5400.5, Revision C02, Chapter II, Section 6.b(2)(b)

External Dose Conversion Factors. 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."

REQUIREMENT SOURCE: DOE ORDER 5400.5, Revision C02, Chapter II, Section 6.b(2)(c)

Derived Concentration Guides (DCG). DCG values are presented as reference values in Chapter III for each of three exposure modes: inhalation of air containing the radionuclide; submersion in a semi-infinite cloud of air containing the radionuclide; and ingestion of water containing the radionuclide. The DCG tables may be used to evaluate only the three exposure modes upon which

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they are based.

REQUIREMENT SOURCE: DOE ORDER 5400.5, Revision C02, Chapter II, Section 6.b(2)(d)

Other Methods and Alternatives. Methods and alternatives other than those discussed above and as prescribed in applicable regulations shall be submitted to EH-1 for approval. EH-1 may approve the alternative method, if appropriate.

REQUIREMENT SOURCE: WAC 173-480, Dated 05-07-86, Section 040

Ambient Standard. Emissions of radionuclides in the air shall not cause a maximum accumulated dose equivalent of more than 25 mrem/y to the whole body or 75 mrem/y to a critical organ of any member of the public. Doses due to radon-220, radon-222, and their respective decay products are excluded from these limits. Compliance with the standard shall be determined by procedures in WAC 173-480-070.

REQUIREMENT SOURCE: WAC 173-480, Dated 05-07-86, Section 050(1) and (3)

(1) All radionuclide emission units are required to meet the emission standards in this chapter. At a minimum, all emission units shall meet WAC 402-10-010 requiring every reasonable effort to maintain radioactive materials in effluents to unrestricted areas, as low as reasonably achievable (ALARA). For the purposes of this chapter, control equipment of facilities operating under ALARA shall be defined as reasonably available control technology (RACT).

(3) Whenever another Federal or State regulation or limitation in effect controls the emission of radionuclides to the ambient air, the more stringent control of emissions shall govern.

REQUIREMENT SOURCE: WAC 173-480, Dated 05-07-86, Section 060

Emission Standards New and Modified Emission Units

(1) Whenever the construction, installation or establishment of a new emission unit subject to this chapter is contemplated, the project shall utilize best available radionuclide control technology (BARCT).

(2) Addition to, enlargement, modification, replacement, alteration of any process or emission unit or replacement of air pollution control equipment which will significantly change potential radionuclide emissions or significantly change the dose equivalent will require the proposed project to utilize best available radionuclide control technology (BARCT) for emission control.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 040(1)

Standards for radioactive air emissions in the state of Washington are contained in WAC

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173-480-040, 173-480-050, and 173-480-060 and 40 CFR Part 61, subparts H and I published in the Federal Register on December 15, 1989. In accordance with WAC 173-480-050(3), the department shall enforce the most stringent standard in effect, notwithstanding any agreement between EPA and any other agency, including those agreements made pursuant to 42 USC 7412(d)(9).

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 040(3)

All new construction and significant modifications of emission units commenced after August 10, 1988 (the date this chapter originally became effective) shall utilize BARCT (see Appendix B).

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 040(4)

All existing emission units and nonsignificant modifications shall utilize ALARACT (see Appendix C).

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 060(3)

If an emission unit is in violation of any standards contained in WAC 246-247-040, the facility shall either submit a compliance plan which describes how it intends to achieve compliance with the standards, and/or cease operation of the emission unit(s). The facility shall submit the compliance plan within forty-five days of the notice of violation. The cessation of operation of the emission unit(s) shall not necessarily exempt the facility from the requirements of this chapter if active or passive ventilation and radioactive air emission controls will still be required. The department reserves the right to take further enforcement action, if necessary, in accordance with WAC 246-247-100.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 120, Appendix B, Paragraph 1

Purpose. A BARCT demonstration is used to choose control technologies for the mitigation of emissions of radioactive material from new emission units or significant modifications to emission units. The bases for the BARCT demonstration requirements are the BARCT standard given in WAC 246-247-040, and the definition of BARCT given in WAC 246-247-030. This procedure incorporates certain implementing criteria that enable the department to evaluate a facility's compliance with the BARCT standard. It is the applicant's responsibility to demonstrate the effectiveness of their BARCT determination to the department. The facility should contact the department at the conceptual design phase for guidance on the BARCT demonstration requirements. The department may adjust this demonstration procedure on a case-by-case basis, as needed, to ensure compliance with the substantive standard.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 120, Appendix B, Paragraph 2

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Scope. The BARCT demonstration includes the abatement technology and indication devices that demonstrate the effectiveness of the abatement technology from entry of radionuclides into the ventilated vapor space to release to the environment. The applicant shall evaluate all available control technologies that can reduce the level of radionuclide emissions.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 130, Appendix C, Paragraph 1

Purpose. An ALARACT demonstration is used for inspection or audit purposes, and to demonstrate compliance with the substantive ALARACT technology standard as required by this chapter. An ALARACT demonstration is used to evaluate the adequacy of control technology on existing emission units and to choose control technologies for proposed nonsignificant modifications of emission units. The bases for the ALARACT demonstration requirements are the ALARACT standards given in WAC 246-247-040 and the definition of ALARACT given in WAC 246-247-030. It is the applicant's responsibility to demonstrate the effectiveness of their ALARACT determination to the department. The department may adjust this demonstration procedure on a case-by-case basis, as needed, to ensure compliance with the substantive standard.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 130, Appendix C, Paragraph 2

Scope. The ALARACT demonstration includes the abatement technology and indication devices, from entry of radionuclides into the ventilated vapor space to release to the environment. The facility shall evaluate the existing control system in relation to applicable technology standards, and other control technologies that have been successfully operated for similar applications.

20.4.4 Liquid Radiological Effluents

Radioactive liquid effluent is sent by tanker cars to the 200 Area for storage and eventual disposal. Radioactive liquid effluent is managed in accordance with DOE Order 5400.1. Refer to Section 20.4.

20.5 Pollution Prevention

Generator requirements for pollution prevention and waste minimization are included in the Waste Management Functional Area Document.

20.6 Recordkeeping, Reports and Notifications

This element addresses requirements for recordkeeping, reports, and notifications. Requirements for the contents and maintenance of the records and reports are included. Some of the reports included in this section are subparts of reports submitted on a site level. However, since the data is collected at the facility level, these reports are

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considered facility requirements.

20.6.1 Air Quality

This subelement specifies the standards for maintenance and control of ambient air and emissions data collected under State and Federal air quality monitoring programs. Refer to the "Hanford Site Air Operating Permit Application," DOE/RL-95-07, Rev. 0, May 1995.

REQUIREMENT SOURCE: WAC 173-400, Dated 09-13-96, Section 105 Introduction

The owner or operator of a source shall upon notification by the director of ecology, maintain records on the type and quantity of emissions from the source and other information deemed necessary to determine whether the source is in compliance with applicable emission limitations and control measures.

REQUIREMENT SOURCE: WAC 173-400, Dated 09-13-96, Section 105(1)

Emission inventory. The owner(s) or operator(s) of any air contaminant source shall submit an inventory of emissions from the source each year. The inventory may include stack and fugitive emissions of particulate matter, PM₁₀, sulfur dioxide, carbon monoxide, total reduced sulfur compounds (TRS), fluorides, lead, VOCs, and other contaminants, and shall be submitted (when required) no later than one hundred five days after the end of the calendar year. The owner(s) or operator(s) shall maintain records of information necessary to substantiate any reported emissions, consistent with the averaging times for the applicable standards.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 060(4)

The facility shall notify the department at least seven calendar days prior to any planned preoperational tests of new or modified emission units that involve emissions control, monitoring, or containment systems of the emission unit(s). The department reserves the right to witness or require preoperational tests involving the emissions control, monitoring, or containment systems of the emission unit(s).

20.6.2 Hazardous Materials

Community Right-to-Know reporting activities are coordinated by a central support group based upon input from facilities and projects pertaining to chemical inventories. Although the central group compiles the information for submittal as necessary, facilities are responsible for providing their pertinent information to complete the report(s).

REQUIREMENT SOURCE: 40 CFR 370, Dated 07-01-95, Part 21

MSDS reporting.

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(a) Basic requirement. The owner or operator of a facility subject to this subpart shall submit an MSDS for each hazardous chemical present at the facility according to the minimum threshold schedule provided in paragraph (b) of §370.20 to the committee, the commission, and the fire department with jurisdiction over the facility.

(b) Alternative reporting. In lieu of the submission of an MSDS for each hazardous chemical under paragraph (a) of this section, the owner or operator may submit the following:

(1) A list of the hazardous chemicals for which the MSDS is required, grouped by hazard category as defined under §370.2 of this part;

(2) The chemical or common name of each hazardous chemical as provided on the MSDS; and

(3) Except for reporting of mixtures under §370.28(a)(2), any hazardous component of each hazardous chemical as provided on the MSDS.

(c) Supplemental reporting.

(1) The owner or operator of a facility that has submitted an MSDS under this section shall provide a revised MSDS to the committee, the commission, and the fire department with jurisdiction over the facility within three months after discovery of significant new information concerning the hazardous chemical for which the MSDS was submitted.

(2) After October 17, 1987, the owner or operator of a facility subject to this section shall submit an MSDS for a hazardous chemical pursuant to paragraph (a) of this section or a list pursuant to paragraph (b) of this section within three months after the owner or operator is first required to prepare or have available the MSDS or after a hazardous chemical requiring an MSDS becomes present in an amount exceeding the threshold established in §370.20(b).

(d) Submission of MSDS upon request. The owner or operator of a facility that has not submitted the MSDS for a hazardous chemical present at the facility shall submit the MSDS for any such hazardous chemical to the committee upon its request. The MSDS shall be submitted within 30 days of the receipt of such request.

REQUIREMENT SOURCE: 40 CFR 370, Dated 07-01-95, Part 25

Inventory reporting.

(a) Basic requirement. The owner or operator of a facility subject to this subpart shall submit an inventory form to the commission, the committee, and the fire department with jurisdiction over the facility. The inventory form containing Tier I information on hazardous chemicals present at the facility during the preceding calendar year above the threshold levels established in §370.20(b) shall be submitted on or before March 1 of each year, beginning in 1988.

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(b) Alternative reporting. With respect to any specific hazardous chemical at the facility, the owner or operator may submit a Tier II form in lieu of the Tier I information.

(c) Submission of Tier II information. The owner or operator of a facility subject to this Section shall submit the Tier II form to the commission, committee, or the fire department having jurisdiction over the facility upon request of such persons. The Tier II form shall be submitted within 30 days of the receipt of each request.

(d) Fire department inspection. The owner or operator of a facility that has submitted an inventory form under this section shall allow on-site inspection by the fire department having jurisdiction over the facility upon request of the department, and shall provide to the department specific location information on hazardous chemicals at the facility.

REQUIREMENT SOURCE: 40 CFR 372, Dated 07-01-95, Part 10(a)

Each person subject to the reporting requirements of this part must retain the following records for a period of 3 years from the date of the submission of a report under §372.30:

- (1) A copy of each report submitted by the person under §372.30.
- (2) All supporting materials and documentation used by the person to make the compliance determination that the facility or establishments is a covered facility under §372.22 or §372.45.
- (3) Documentation supporting the report submitted under §372.30 including:
 - (i) Documentation supporting any determination that a claimed allowable exemption under §372.38 applies.
 - (ii) Data supporting the determination of whether a threshold under §372.25 applies for each toxic chemical.
 - (iii) Documentation supporting the calculations of the quantity of each toxic chemical released to the environment or transferred to an off-site location.
 - (iv) Documentation supporting the use indications and quantity on site reporting for each toxic chemical, including dates of manufacturing, processing, or use.
 - (v) Documentation supporting the basis of estimate used in developing any release or off-site transfer estimates for each toxic chemical.
 - (vi) Receipts or manifests associated with the transfer of each toxic chemical in waste to off-site locations.
 - (vii) Documentation supporting reported waste treatment methods, estimates of treatment

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efficiencies, ranges of influent concentration to such treatment, the sequential nature of treatment steps, if applicable, and the actual operating data, if applicable, to support the waste treatment efficiency estimate for each toxic chemical.

REQUIREMENT SOURCE: 40 CFR 372, Dated 07-01-95, Part 10(b)

Each person subject to the notification requirements of this part must retain the following records for a period of 3 years from the date of the submission of a notification under §372.45.

- (1) All supporting materials and documentation used by the person to determine whether a notice is required under §372.45.
- (2) All supporting materials and documentation used in developing each required notice under §372.45 and a copy of each notice.

REQUIREMENT SOURCE: 40 CFR 372, Dated 07-01-95, Part 10(c)

Records retained under this section must be maintained at the facility to which the report applies or from which a notification was provided. Such records must be readily available for purposes of inspection by EPA.

REQUIREMENT SOURCE: 40 CFR 372, Dated 07-01-95, Part 10(d)

Each owner or operator who determines that the owner operator may apply the alternate threshold as specified under §372.27(a) must retain the following records for a period of 3 years from the date of the submission of the certification statement as required under §372.27(b):

- (1) A copy of each certification statement submitted by the person under §372.27(b).
- (2) All supporting materials and documentation used by the person to make the compliance determination that the facility or establishment is eligible to apply the alternate threshold as specified in §372.27.
- (3) Documentation supporting the certification statement submitted under §372.27(b) including:
 - (i) Data supporting the determination of whether the alternate threshold specified under §372.27(a) applies for each toxic chemical.
 - (ii) Documentation supporting the calculation of annual reportable amount, as defined in §372.27(a), for each toxic chemical, including documentation supporting the calculations and the calculations of each data element combined for the annual reportable amount.
 - (iii) Receipts or manifests associated with the transfer of each chemical in waste to off-site locations.

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REQUIREMENT SOURCE: 40 CFR 372, Dated 07-01-95, Part 30(a)

For each toxic chemical known by the owner or operator to be manufactured (including imported), processed, or otherwise used in excess of an applicable threshold quantity in §372.25 at its covered facility described in §372.22 for a calendar year, the owner or operator must submit to EPA and to the State in which the facility is located a completed EPA Form R (EPA Form 9350-1) in accordance with the instructions referred to in subpart E of this part.

REQUIREMENT SOURCE: 40 CFR 372, Dated 07-01-95, Part 30(b)

(1) The owner or operator of a covered facility is required to report as described in paragraph (a) of this section on a toxic chemical that the owner or operator knows is present as a component of a mixture or trade name product which the owner or operator receives from another person, if that chemical is imported, processed, or otherwise used by the owner or operator in excess of an applicable threshold quantity in §372.25 at the facility as part of that mixture or trade name product.

(2) The owner or operator knows that a toxic chemical is present as a component of a mixture or trade name product (i) if the owner or operator knows or has been told the chemical identity or Chemical Abstracts Service Registry Number of the chemical and the identity or Number corresponds to an identity or Number in §372.65, or (ii) if the owner or operator has been told by the supplier of the mixture or trade name product that the mixture or trade name product contains a toxic chemical subject to section 313 of the Act or this part.

(3) To determine whether a toxic chemical which is a component of a mixture or trade name product has been imported, processed, or otherwise used in excess of an applicable threshold in §372.25 at the facility, the owner or operator shall consider only the portion of the mixture or trade name product that consists of the toxic chemical and that is imported, processed, or otherwise used at the facility, together with any other amounts of the same toxic chemical that the owner or operator manufactures, imports, processes, or otherwise uses at the facility as follows:

(i) If the owner or operator knows the specific chemical identity of the toxic chemical and the specific concentration at which it is present in the mixture or trade name product, the owner or operator shall determine the weight of the chemical imported, processed, or otherwise used as part of the mixture or trade name product at the facility and shall combine that with the weight of the toxic chemical manufactured (including imported), processed, or otherwise used at the facility other than as part of the mixture or trade name product. After combining these amounts, if the owner or operator determines that the toxic chemical was manufactured, processed, or otherwise used in excess of an applicable threshold in §372.25, the owner or operator shall report the specific chemical identity and all releases of the toxic chemical on EPA Form R in accordance with the instructions referred to in subpart E of this part.

(ii) If the owner or operator knows the specific chemical identity of the toxic chemical and does

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not know the specific concentration at which the chemical is present in the mixture or trade name product, but has been told the upper bound concentration of the chemical in the mixture or trade name product, the owner or operator shall assume that the toxic chemical is present in the mixture or trade name product at the upper bound concentration, shall determine whether the chemical has been manufactured, processed, or otherwise used at the facility in excess of an applicable threshold as provided in paragraph (b)(3)(i) of this section, and shall report as provided in paragraph (b)(3)(i) of this section.

(iii) If the owner or operator knows the specific chemical identity of the toxic chemical, does not know the specific concentration at which the chemical is present in the mixture or trade name product, has not been told the upper bound concentration of the chemical in the mixture or trade name product, and has not otherwise developed information on the composition of the chemical in the mixture or trade name product, then the owner or operator is not required to factor that chemical in that mixture or trade name product into threshold and release calculations for that chemical.

(iv) If the owner or operator has been told that a mixture or trade name product contains a toxic chemical, does not know the specific chemical identity of the chemical and knows the specific concentration at which it is present in the mixture or trade name product, the owner or operator shall determine the weight of the chemical imported, processed, or otherwise used as part of the mixture or trade name product at the facility. Since the owner or operator does not know the specific identity of the toxic chemical, the owner or operator shall make the threshold determination only for the weight of the toxic chemical in the mixture or trade name product. If the owner or operator determines that the toxic chemical was imported, processed, or otherwise used as part of the mixture or trade name product in excess of an applicable threshold in §372.25, the owner or operator shall report the generic chemical name of the toxic chemical, or a trade name if the generic chemical name is not known, and all releases of the toxic chemical on EPA Form R in accordance with the instructions referred to in subpart E of this part.

(v) If the owner or operator has been told that a mixture or trade name product contains a toxic chemical, does not know the specific chemical identity of the chemical, and does not know the specific concentration at which the chemical is present in the mixture or trade name product, but has been told the upper bound concentration of the chemical in the mixture or trade name product, the owner or operator shall assume that the toxic chemical is present in the mixture or trade name product at the upper bound concentration, shall determine whether the chemical has been imported, processed, or otherwise used at the facility in excess of an applicable threshold as provided in paragraph (b)(3)(iv) of this section, and shall report as provided in paragraph (b)(3)(iv) of this section.

(vi) If the owner or operator has been told that a mixture or trade name product contains a toxic chemical, does not know the specific chemical identity of the chemical, does not know the specific concentration at which the chemical is present in the mixture or trade name product, including information they have themselves developed, and has not been told the upper bound concentration of the chemical in the mixture or trade name product, the owner or operator is not required to

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report with respect to that toxic chemical.

REQUIREMENT SOURCE: 40 CFR 372, Dated 07-01-95, Part 30(c)

A covered facility may consist of more than one establishment. The owner or operator of such a facility at which a toxic chemical was manufactured (including imported), processed, or otherwise used in excess of an applicable threshold may submit a separate Form R for each establishment or for each group of establishments within the facility to report the activities involving the toxic chemical at each establishment or group of establishments, provided that activities involving that toxic chemical at all the establishments within the covered facility are reported. If each establishment or group of establishments files separate reports then for all other chemicals subject to reporting at that facility they must also submit separate reports. However, an establishment or group of establishments does not have to submit a report for a chemical that is not manufactured (including imported), processed, otherwise used, or released at that establishment or group of establishments.

REQUIREMENT SOURCE: WAC 118-40, Dated 09-12-88, Section 20

It is the purpose of this chapter to implement the provisions of Title III in the state of Washington to establish a mechanism for compliance by state and local governmental agencies and industry with the provisions of Title III. This chapter is promulgated under the general policy and rule-making authority of the Department of Community Development as established by RCW 38.52.030(2); 38.52.050 (1) and (3); and 43.63A.060. Compliance with the requirements of Title III, as recognized by the United States Environmental Protection Agency, is regarded as compliance with the provisions of this chapter. Where federal regulations are duplicated or referred to in this chapter, Title III citations are provided. This chapter is not intended to mandate any new compliance requirements beyond those required by Title III.

20.6.3 Radiological Effluents

This subelement specifies the standards for maintenance and control of data and records of routine radiological effluent discharges and/or spills to the atmosphere.

REQUIREMENT SOURCE: 40 CFR 61, Dated 07-01-95, Part 14(f)

The owner or operator shall maintain records of monitoring data, monitoring system calibration checks, and the occurrence and duration of any period during which the monitoring system is malfunctioning or inoperative. These records shall be maintained at the source for a minimum of 2 years and made available, upon request, for inspection by the Administrator.

REQUIREMENT SOURCE: 40 CFR 61, Dated 07-01-95, Part 94

Compliance and reporting.

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- (a) Compliance with this standard shall be determined by calculating the highest effective dose equivalent to any member of the public at any offsite point where there is a residence, school, business or office. The owners or operators of each facility shall submit an annual report to both EPA headquarters and the appropriate regional office by June 30 which includes the results of the monitoring as recorded in DOE's Effluent Information System and the dose calculations required by §167; 61.93(a) for the previous calendar year.
- (b) In addition to the requirements of paragraph (a) of this section, an annual report shall include the following information:
- (1) The name and location of the facility.
 - (2) A list of the radioactive materials used at the facility.
 - (3) A description of the handling and processing that the radioactive materials undergo at the facility.
 - (4) A list of the stacks or vents or other points where radioactive materials are released to the atmosphere.
 - (5) A description of the effluent controls that are used on each stack, vent, or other release point and an estimate of the efficiency of each control device.
 - (6) Distances from the points of release to the nearest residence, school, business or office and the nearest farms producing vegetables, milk, and meat.
 - (7) The values used for all other user-supplied input parameters for the computer models (e.g., meteorological data) and the source of these data.
 - (8) A brief description of all construction and modifications which were completed in the calendar year for which the report is prepared, but for which the requirement to apply for approval to construct or modify was waived under §167; 61.96 and associated documentation developed by DOE to support the waiver. EPA reserves the right to require that DOE send to EPA all the information that normally would be required in an application to construct or modify, following receipt of the description and supporting documentation.
 - (9) Each report shall be signed and dated by a corporate officer or public official in charge of the facility and contain the following declaration immediately above the signature line: "I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. See, 18 U.S.C. 1001."

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(c) If the facility is not in compliance with the emission limits of §167; 61.92 in the calendar year covered by the report, then the facility must commence reporting to the Administrator on a monthly basis the information listed in paragraph (b) of this section, for the preceding month. These reports will start the month immediately following the submittal of the annual report for the year in noncompliance and will be due 30 days following the end of each month. This increased level of reporting will continue until the Administrator has determined that the monthly reports are no longer necessary. In addition to all the information required in paragraph (b) of this section, monthly reports shall also include the following information:

- (1) All controls or other changes in operation of the facility that will be or are being installed to bring the facility into compliance.
- (2) If the facility is under a judicial or administrative enforcement decree, the report will describe the facilities performance under the terms of the decree.
- (d) In those instances where the information requested is classified, such information will be made available to EPA separate from the report and will be handled and controlled according to applicable security and classification regulations and requirements.

REQUIREMENT SOURCE: 40 CFR 61, Dated 07-01-95, Part 95

Recordkeeping requirements.

All facilities must maintain records documenting the source of input parameters including the results of all measurements upon which they are based, the calculations and/or analytical methods used to derive values for input parameters, and the procedure used to determine effective dose equivalent. This documentation should be sufficient to allow an independent auditor to verify the accuracy of the determination made concerning the facility's compliance with the standard. These records must be kept at the site of the facility for at least five years and, upon request, be made available for inspection by the Administrator, or his authorized representative.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 080(2)

All reporting and recordkeeping requirements of 40 CFR 61, subparts H and I published in the Federal Register on December 15, 1989, are adopted by reference, as applicable as specified by the reference subparts.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 080(3)

The facility shall annually submit to the department the information requirements adopted in subsection (2) of the section, as applicable, along with the following additional information, as applicable:

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- (a) The results of emission measurements for those emission units subject only to periodic confirmatory measurements;
- (b) Wind rose or joint frequency table;
- (c) Annual average ambient temperature;
- (d) Annual average emission unit gas temperature, if available; (e) Annual total rainfall;
- (f) Annual average emission unit flow rate and total volume of air released during the calendar year.

If this additional information is available in another annual report, the facility may instead provide a copy of that report along with the information requirements in this subsection. Annual reports are due by June 30 for the previous calendar years's operations.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 080(4)

Any report or application that contains proprietary or procurement-sensitive information shall be submitted to the department with those portions so designated. The department shall hold this information confidential, unless required to release the information pursuant to laws, regulations, or court order.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 080(5)

The facility shall notify the department within twenty-four hours of any shutdown, or of any transient abnormal condition lasting more than four hours or other change in facility operations which, if allowed to persist, would result in emissions of radioactive material in excess of applicable standards or license requirements. If requested by the department, the facility shall submit a written report within ten days including known causes, corrective actions taken, and any preventive measures taken or planned to minimize or eliminate the chance of recurrence.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 080(6)

The facility shall file a report of closure with the department whenever operations producing emissions of radioactive material are permanently ceased at any emission unit (except temporary emission units) regulated under this chapter. The closure report shall indicate whether, despite cessation of operations, there is still a potential for radioactive air emissions and a need for an active or passive ventilation system with emission control and/or monitoring devices. If decommissioning is planned and will constitute a modification, a NOC is required, as applicable, in accordance with WAC 246-247-060.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 080(7)

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The facility shall maintain a log for each emission unit that has received categorical approval under WAC 246-247-060(8). The log shall contain records of important operations parameters including the date, location, and duration of the release, measured or calculated radionuclide concentrations, the type of emissions (liquid, gaseous, solid) and the type of emission control and monitoring equipment.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 080(8)

The facility shall maintain readily retrievable storage areas for all records and documents related to, and which may help establish compliance with, the requirements of the chapter. The facility shall keep these records available for department inspection for at least five years.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 080(10)

The facility shall make available, in a timely manner, all documents requested by the department for review. The facility shall allow the department to review documents in advance of an inspection. The facility shall allow access to classified documents by representatives of the department with the appropriate security clearance and demonstrable need-to-know.

REQUIREMENT SOURCE: WAC 246-247, Dated 04-04-94, Section 080(11)

The facility shall respond in writing in a timely manner, or within a time limit set by the department. The inspection results which require the facility to implement corrective actions or any other actions so directed by the department.

20.6.4 Spills and Discharges

This subelement specifies the requirements of WAC 173-303-145 for response to spills and discharges of dangerous wastes, and for reporting releases of hazardous substances which threaten human health or the environment. Related requirements for the spill or discharge of hazardous substances are addressed in the 324 Building Emergency Management Functional Area.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 145(2)

Notification. Any person who is responsible for a spill or nonpermitted discharge must immediately notify the individuals and authorities described for the following situations:

(a) For spills or discharges onto the ground or into groundwater or surface water, notify all local authorities in accordance with the local emergency plan. If necessary, check with the local emergency service coordinator and the fire department to determine all notification responsibilities under the local emergency plan. Also, notify the appropriate regional office of the department of ecology;

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(b) For spills or discharges which result in emissions to the air, notify all local authorities in accordance with the local emergency plan. If necessary, check with the local emergency service coordinator and the fire department to determine all notification responsibilities under the local emergency plan. Also, in western Washington notify the local air pollution control authority, or in eastern Washington notify the appropriate regional office of the department of ecology.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 145(3)

Mitigation and control. The person responsible for a spill or nonpermitted discharge must take appropriate immediate action to protect human health and the environment (e.g., diking to prevent contamination of state waters, shutting of open valves).

(a) In addition, the person responsible for a spill or discharge must:

(i) Clean up all released dangerous wastes or hazardous substances, or take such actions as may be required or approved by federal, state, or local officials acting within the scope of their official responsibilities. This may include complete or partial removal of released dangerous wastes or hazardous substances as may be justified by the nature of the released dangerous wastes or hazardous substances, the human and environmental circumstances of the incident, and protection required by the Water Pollution Control Act, chapter 90.48 RCW;

(ii) Designate and treat, store or dispose of all soils, waters, or other materials contaminated by the spill or discharge in accordance with this chapter 173-303 WAC. The department may require testing in order to determine the amount or extent of contaminated materials, and the appropriate designation, treatment, storage, or disposal for any materials resulting from clean-up; and

(iii) If the property on which the spill or discharge occurred is not owned or controlled by the person responsible for the incident, restore the area impacted by the spill or discharge, and replenish resources (e.g., fish, plants) in a manner acceptable to the department.

(b) Where immediate removal or temporary storage of spilled or discharged dangerous wastes or hazardous substances is necessary to protect human health or the environment, the department may direct that removal be accomplished without a manifest, by transporters who do not have EPA/state identification numbers.

20.6.5 Dangerous Waste

This subelement specifies the requirements for facility recordkeeping for dangerous waste TSD units.

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 390(2)

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Annual reports. The owner or operator of a facility that holds an active EPA/state identification number must prepare and submit a single copy of an annual report to the department by March 1 of each year. The report form and instructions in the Dangerous Waste Annual Report (which may be obtained from the department) must be used for this report. In addition, any facility which ships dangerous waste off-site must comply with the annual reporting requirements of WAC 173-303-220. The annual report must cover facility activities during the previous calendar year and must include, but is not limited to the following information:

- (a) The EPA/state identification number, name, and address of the facility;
- (b) The calendar year covered by the report;
- (c) For off-site facilities, the EPA/state identification number of each dangerous waste generator from which the facility received a dangerous waste during the year. For imported shipments, the report must give the name and address of the foreign generator;
- (d) A description and the quantity of each dangerous waste the facility received during the year. For off-site facilities, this information must be listed by EPA/state identification number of each generator;
- (e) The method of treatment, storage, or disposal for each dangerous waste;
- (f) The most recent closure cost estimate under WAC 173-303-620(3) (or 40 CFR 265.142 for interim status facilities), and for disposal facilities, the most recent post-closure cost estimate under WAC 173-303-620(5) (or 40 CFR 265.144 for interim status facilities); and
- (g) The certification signed in accordance with the requirements of WAC 173-303-810(12).

REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 390(3)

Additional reports. The owner or operator must report to the department:

- (a) Releases of dangerous wastes, fires, and explosions as specified in WAC 173-303-360 (2)(k), facility closures specified in WAC 173-303-610(6);
- (b) Interim status groundwater monitoring data, as specified in 40 CFR 265.94 (a)(2) and (b)(2);
- (c) Facility closures specified in WAC 173-303-610(6); and
- (d) As otherwise required by WAC 173-303-645 through 173-303-665, WAC 173-303-690 through 173-303-691, and WAC 173-303-400.

The owner or operator must also submit any other reports (including engineering reports, plans, and specifications) required by the department.

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REQUIREMENT SOURCE: WAC 173-303, Dated 11-01-95, Section 390(4)

Recordkeeping. The owner/operator of a facility must keep a copy of all unmanifested waste reports, annual reports, and any other reports submitted to the department according to the requirements of this section for a period of three years from the date the report was submitted.

20.7 Key Interfaces

This element describes key functional interfaces. The key interfaces for Environmental Protection are Waste Management and Radiation Protection.

20.7.1 Radiation Protection

The Radiation Protection functional area relates primarily to protection of personnel and the public from radiation exposure whereas the radiation requirements listed in this functional area deal with protecting the environment. Some requirements apply to both functional areas and therefore may be listed in both areas.

20.7.2 Waste Management

The Environmental Protection functional area includes primarily Washington Administrative Code (WAC) requirements dealing with the recordkeeping, reporting, permitting, and monitoring requirements for dangerous wastes at the 324 Building facility. The Waste Management functional area includes requirements for identification and management of dangerous wastes. Requirements concerning the storage, labeling, and recordkeeping for PCBs are included in the WM functional area and therefore are not included in the EP functional area.

20.8 References

20.8.1 Requirement Source Documents

See the attached "RIDS by Document X-Reference Listing" for the documents used as requirements sources in the development of this Functional Area.

20.8.2 Reviewed Documents Not Used as Requirement Sources

The following references were reviewed but not included in preparation of the Environmental Protection Functional Area Document.

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10 CFR Part 70.59, Effluent Monitoring Reporting Requirements

10 CFR 1021, Compliance with the National Environmental Policy Act (NEPA), 04/24/92

40 CFR 1500, National Environmental Policy Act (NEPA) Procedures

40 CFR 1501, CEQ NEPA and Agency Planning Regulations, 05/24/77

40 CFR 1502, Environmental Impact Statement, 11/29/78

40 CFR 1505, NEPA and Agency Decisionmaking, 11/29/78

40 CFR 1506, Other Requirements of NEPA, 07/30/79

40 CFR 1507, Agency Compliance, 05/24/77

40 CFR 1508, CEQ Regulations on Terminology and Index, 05/24/77

DOE 5440.1E, National Environmental Policy Act Compliance Program, 11/10/92

DOE/EH0173T, Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance, U.S. Department of Energy, January 1991

EPA Pollution Prevention Strategy, 56FR 7849, February 26, 1991

Executive Order 12580, Superfund Implementation

Executive Order 12777, Implementation of Section 311 of the Federal Water Pollution Control Act

Executive Order 12088, Federal Compliance with Pollution Control Standards

WAC-173-205, Whole Effluent Toxicity Testing and Limits

WAC 173-216, Water Quality Standards for Groundwater of the State of Washington, amended through 10/23/93

WAC 173-218, Underground Injection Control Program, 02/29/84

WAC 173-240, Submission of Plans and Reports for Construction of Wastewater

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Facilities, amended through 11/16/83

WAC 173-307, Plans, 01/01/95

WAC 193-11, SEPA Rules, amendments effective through 03/31/95

WAC 246-272, On-Site Sewage Systems, amended through 01/01/95

Storm Water Waste Management For Industrial Activities Summary Guidance

Federal Agency Hazardous Waste Compliance Docket July 18, 1991, Raymond B.
Ludwiszewski

RIDs by Document X-Reference Listing
Based on 324-EP-SD RID and including all documents.

40 CFR 60, Protection of Environment

40 CFR 61, National Emission Standards for Hazardous Air Pollutants, Dated 07-01-95

40 CFR 370, Hazardous Chemical Reporting: Community Right-to-Know, Dated 07-01-95

40 CFR 372, Toxic Chemical Release Reporting: Community Right-to-Know, Dated 07-01-95

DOE ORDER 5400.1, General Environmental Protection Program, Revision C01

DOE ORDER 5400.5, Radiation Protection of the Public and the Environment, Revision C02

DOE ORDER 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements, Revision C07

DOE ORDER 5820.2A, Radioactive Waste Management

NWP 95-300/324 LAB, Department of Health

In the matter of approving a modification contaminant source for U.S. DOE, Richland

TRIPARTY AGREEMENT, Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement), Revision 6

WAC 118-40, Hazardous Chemical Emergency Response Planning and Community Right-to-Know Reporting, Dated 09-12-88

WAC 173-200, Water Quality Standards for Ground Waters of the State of Washington, Dated 01-31-95

WAC 173-303, Dangerous Waste Regulations, Dated 11-01-95

WAC 173-360, Underground Storage Tank Regulations, Dated 03-04-95

WAC 173-400, General Regulations For Air Pollution Sources, Dated 09-13-96

WAC 173-460, Controls for New Sources of Toxic Air Pollutants, Dated 02-14-94

WAC 173-480, Ambient Air Quality Standards and Emission Limits for Radionuclide, Dated 05-07-86

WAC 246-247, Radiation Protection -- Air Emissions, Dated 04-04-94

*** End of RIDs by Document X-Reference Listing ***

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