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7. Abstract

The Standards/Requirements Identification Document (S/RID) is a list of the Environmental, Safety and Health (ES&H) and Safeguards and Security (SAS) standards/requirements applicable to the K Basins facility.

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K Basins S/RIDS

Prepared by: Spent Nuclear Fuels, Standards and Requirements

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TABLE OF CONTENTS

1. INTRODUCTION 1-1

LIST OF APPENDICES

Appendix MS MANAGEMENT SYSTEMS MS-1
Appendix QA QUALITY ASSURANCE QA-1
Appendix CM CONFIGURATION MANAGEMENT CM-1
Appendix TN TRAINING AND QUALIFICATION TN-1
Appendix EM EMERGENCY MANAGEMENT EM-1
Appendix SS SAFEGUARDS AND SECURITY SS-1
Appendix EN ENGINEERING PROGRAM EN-1
Appendix CS CONSTRUCTION PROGRAM CP-1
Appendix OP OPERATIONS OP-1
Appendix MN MAINTENANCE MN-1
Appendix RP RADIATION PROTECTION RP-1
Appendix FP FIRE PROTECTION FP-1
Appendix PT PACKAGING AND TRANSPORTATION PT-1
Appendix WM WASTE MANAGEMENT WM-1
Appendix NS NUCLEAR SAFETY NS-1
Appendix OH OCCUPATIONAL SAFETY AND HEALTH OH-1
Appendix EP ENVIRONMENTAL PROTECTION EP-1

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1. INTRODUCTION

The purpose of the K-Basins Standards/Requirements Identification Document (S/RID) is to identify the set of requirements that are necessary and sufficient to provide an adequate level of protection of workers, the public, and the environment. This has been developed to meet the intent of the Defense Nuclear Facilities Safety Board (DNFSB) recommendation 90-2, follows the structure of the Environment, Safety and Health Configuration Guide (ES&HCG) Revision 0, dated July 30, 1993, and is compatible with the Department of Energy (DOE) S/RID Development and Approval Instructions, dated September 1994. The requirements in this S/RID pertain to the ongoing storage of spent nuclear fuel in the K-Basins and are not intended to define that set of requirements associated with the removal of fuel and sludge from the basins and subsequent processing and storage. The Spent Nuclear Fuel Project Technical Baseline Document, WHC-SD-SNF-SD-003, provides the functions and requirements for these activities.

This S/RID contains seventeen of the twenty ES&HCG Functional Areas which are considered applicable to K-Basins. Three functional areas of the ES&HCG (Environmental Restoration, Decontamination and Decommissioning, and Research and Development and Experimental Activities) are not applicable to K-Basins.

This S/RID document has been generated from a computer data base and does not contain subsection numbers and titles for which there have been no requirements cited (e.g. Subsection 9.2 is not listed since it has no requirements in itself but Subsections 9.2.1 and 9.2.2 are listed since this is where the requirements have been cited).

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1.0 MANAGEMENT SYSTEMS

1.0 MANAGEMENT SYSTEMS

1.1.1.1 Policies and Program Plans

DOE5480.19 Attachment I, Chapter I, Section C.1

Operations Policies
Procedures or other definitive documentation should specify policies that are to be applied for operations. These policies should also 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.

1.1.1.2 Procedures

10CFR 830 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.

DOE5480.19 Attachment I, Chapter I, Section C.1

Operations Policies
Procedures or other definitive documentation should specify policies that are to be applied for operations. These policies should also 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

10CFR 830 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.

DOE5480.19 Attachment I, Chapter I, Section C.4

Accountability
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

DOE/EH0135 OA.6

PERFORMANCE OBJECTIVE:
Personnel programs should ensure that appropriate job qualification requirements or position descriptions are established for all positions that affect safe and reliable operation.

DOE5480.20A 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

1.0 MANAGEMENT SYSTEMS

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.

DOE5480.20A Chapter I, Section 4.a

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.

DOE5480.20A 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.

DOE5480.20A Chapter I, Section 5.a

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.

DOE5480.20A Chapter I, Section 5.b

Even though applied broadly to personnel in the operating organization, the term qualification has a different application for different positions. For example, managers and technical staff personnel may be considered qualified by virtue of meeting the entry-level requirements associated with the position and by completing applicable position-specific training (see paragraph 7h and 7i). A comprehensive examination need not be administered to determine their qualification. Continuing training and professional development programs should be established to meet the needs of the individual and the position. Chapter I, paragraph 7d(1) contains requirements that shall be included in the continuing training program to the extent to which they apply to the position. Satisfactory performance of their assigned duties and assessment of individual performance such as that which is typically included in personal performance appraisals may be used to document continued satisfactory performance.

1.1.4 Training and Qualification

10CFR 830 Part 120(c)(1)(ii)

Personnel Training and Qualifications. 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.

DOE5480.20A Chapter I, Section 7.a Introduction

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.

1.0 MANAGEMENT SYSTEMS

DOE5480.20A Chapter I, Section 7.b Introduction, Sentences 1 & 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.

DOE5480.20A Chapter I, Section 7.b.(1)

The basic elements of a systematic approach to training include the following:

(1) A systematic analysis of the jobs to be performed.

Analysis typically involves the conduct of job analysis, needs analysis, or both; job analysis to determine tasks for training, and needs analysis to distinguish between actual and desired performance and to propose workable solutions. The analysis should include both normal and emergency duties. Program goals are then established and the scope of training program content is defined.

A graded approach should be used when analyzing jobs. For example, experience with the conduct of job and task analysis has shown that detailed methods such as those described in industry task analysis procedures or in the DOE Guidelines for Job and Task Analysis for Department of Energy Nuclear Facilities, DOE/EP-0095, are rarely needed. Rather, using qualified trainers and subject matter experts, more simplified methods can produce equivalent results as effectively and more efficiently. One method that can be used to conduct a job analysis is the table-top job analysis method.

This is a method where a team of trainers, subject matter experts (e.g.,qualified employees), and supervisors meet to identify duty areas involved in a specific job, tasks performed within each duty area, and tasks that should be included in the training program. The resulting task list typically ranges from the teens to approximately 250 tasks with the average being 125 - 150 for an operator or maintenance program. At non-reactor nuclear facilities where operator positions are sometimes more narrowly defined than a reactor operator job, the average is less. The verification and modification of task lists from similar facilities and jobs has also been found to be an effective method of job analysis. Similarly, table-top methods can also be used to derive learning objectives from task lists. These methods are less time consuming, more cost effective, and are usually self-validating.

Because of varied complexity and scope of job functions, the degree of analysis (needs analysis, job analysis, task analysis) necessary to define training program content will vary. For example, a job and needs analysis may be appropriate for operations and maintenance personnel, whereas a less formal broad-based assessment of training needs is appropriate for technical staff personnel. Job analyses need not be conducted for technical staff personnel. Consensus-based content guides should be used to assist with the determination of technical staff training program content. This method may also be sufficient to determine training program content for operating organization positions at many category 3 hazard nuclear facilities.

DOE5480.20A Chapter I, Section 7.b.(2)

The basic elements of a systematic approach to training include the following:

(2) Learning objectives derived from the analysis of the job that describe desired performance after training.

Learning objectives define the content of the training program. They are derived from task statements and represent the knowledge and skills necessary to perform the job. The objectives are organized into instructional units and sequenced to aid in the learning process. The objectives form the "blueprint" which guides the development of all training materials, tests, and strategies. Objectives are determined using one or more content analysis techniques. The most common techniques include verification analysis, document analysis, templating, detailed task analysis, or group brainstorming. In most cases the learning objectives, which address the knowledge and skills necessary to perform the task, can be developed directly from the task list and do not require additional analysis. A graded approach should be used to select the most effective technique for determining the learning objectives. For example, experience has shown that detailed task analysis is not necessary when good operating procedures exist or if improper performance of the task is of low consequence. Group brainstorming or a jointreview of the procedure by a trainer and a subject matter expert (SME) can produce acceptable results.

1.0 MANAGEMENT SYSTEMS

DOE5480.20A Chapter I, Section 7.b.(3)

The basic elements of a systematic approach to training include the following:

(3) Training design, development, and implementation based on the learning objectives.

Materials (e.g., lesson plans and OJT guides, training aids, and student materials) are developed to conduct training. The materials should reflect good instructional design and incorporate methods and activities that maximize knowledge and skill retention. Development of additional learning objectives, and in some cases, rewording of objectives also occurs. A graded approach should be used to develop training materials. For example, the training materials used to guide discussions with technical staff trainees could include a one-page outline of the lesson content that includes the key points and a student handout to distribute. The level of detail should take into account the job position and experience of the designated instructor. This approach may also be sufficient for much of the training that is conducted at category 3 hazard nuclear facilities. Training/Evaluation standards are also developed to provide guidance for on-the-job training. Additional activities include development of test items and examinations. Technical and instructional reviews of the products that are developed should be conducted. Recommendations resulting from these reviews should be incorporated as necessary to assure that program content is both technically and educationally sound.

Program implementation consists of activities related to the actual conduct of training, as well as resource allocation, planning, and scheduling. Implementation requires assigning instructors and support staff, scheduling training and facilities, and conducting training.

DOE5480.20A Chapter I, Section 7.b.(4)

The basic elements of a systematic approach to training include the following:

(4) Evaluation of trainee mastery of the objectives during training.

Mastery of the learning objectives by the trainees should be evaluated periodically during the training. Evaluation methods include oral questioning, written examinations, performance of related tasks by the use of evaluation instruments (e.g., qualification standards, checklists, performance tests, job performance measures (JPM), or other similar methods). Evaluations should be content valid, administered consistently, controlled, and documented as appropriate to the level of assurance needed. Content valid examinations are examinations that accurately and consistently measure the associated learning objectives. A graded approach should be used during evaluation. For example, structured on-the-job familiarization can be used in lieu of formal on-the-job evaluation for managers, non-certified supervisors, and technical staff personnel. Much of the training for managers, non-certified supervisors, and technical staff personnel occurs in nontraditional settings such as discussions with individual managers. In addition, learning objectives for managers, non-certified supervisors, and technical staff personnel may not be readily adaptable to prescribed standards or quantitative testing. In such instances, qualitative evaluations are acceptable. For example, trainee mastery could be assessed from responses during discussions, behavior during role-playing, or material developed during training exercises. Qualitative evaluations may also be used to assess trainee mastery of learning at category 3 hazard nuclear facilities.

DOE5480.20A Chapter I, Section 7.b.(5)

The basic elements of a systematic approach to training include the following:

(5) Evaluation and revision of the training based on the performance of trained personnel in the job setting.

Evaluation provides the critical feedback loop to ensure the training is up to date and reflects the requirements of the job. Specifically, training programs are evaluated for program and lesson content adequacy, test adequacy, presentation adequacy, documentation adequacy, and post-training job performance. In addition, the operating performance of job incumbents should be monitored to determine individual strengths and weaknesses. The feedback received from the evaluation process is used to modify and improve program content and delivery. Program content should be periodically monitored and revisions should be made (as appropriate) to include changes in areas such as policies and/or procedures, system or component design, job requirements, regulatory requirements, and industry guidelines or commitments. Adjustments should also be made as a result of reviews of operating experience information such as Occurrence Reports, inspection reports, information notices, and bulletins. Feedback obtained from instructors, students, and supervisors is also reviewed for its potential impact on future training programs. The results are translated into action items or recommendations which are factored into program content.

1.0 MANAGEMENT SYSTEMS

1.2.1.1 Policy System and Coverage Criteria

DOE5480.19 Attachment I, Chapter I, Section C.1

Operations Policies
Procedures or other definitive documentation should specify policies that are to be applied for operations. These policies should also 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.

1.2.1.2 Procedure System and Hierarchy

10CFR 830 Part 120(c)(1)(iv)

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.

1.2.1.3 Policy and Procedure Types

DOE5480.19 Attachment I, Chapter XVI, Section C.1, Paragraph 2

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 abnormal conditions or changes in plant status and provide the appropriate corrective action should bedeveloped 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.

1.2.1.4.1 Preparation Processes for Policies and Procedures

DOE5480.19 Attachment I, Chapter XVI, Section C.1, Paragraph 1

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.

1.2.1.4.2 Policy and Procedure Format and Content

DOE/EH0135 TS.2.12

Procedures and documents require that adequate records are maintained on a timely basis for support services performed at each facility on the site.

DOE5480.19 Attachment I, Chapter XVI, Section C.1, Paragraph 2

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 abnormal conditions or changes in plant status and provide the appropriate corrective action should bedeveloped 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.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.a

The scope and applicability of individual procedures should be readily apparent. Procedures with single-unit applicability should be distinctively identified to avoid confusion with sister-unit procedures. In addition, to enhance rapid retrieval, emergency procedures should be distinguishable from other procedures. Color coding could be used for these purposes.

1.0 MANAGEMENT SYSTEMS

DOE5480.19 Attachment I, 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.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.c

Prerequisites and initial conditions should be detailed. Careful consideration should be given to the location of this information within the procedure in order to help ensure that the intent of the procedure is understood. In addition, any hoses, tools, or other temporary testing equipment should be verified operable, calibrated, or inspected and in good condition where possible, before implementing any test procedure, to ensure that they function as expected during the test. These verifications should be identified in the prerequisite section, with completion sign-offs required. "Hold" points (requiring independent verification and/or approval) should be clearly delineated.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.d

Definitions used in the procedure should be explained.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.e

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

DOE5480.19 Attachment I, Chapter XVI, Section C.2.f

Procedures should contain only one action per step.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.g

Procedures should contain sufficient but not excessive detail. The skill level, experience, and training of the users should be considered.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.h

Warnings, notes, and cautions should be easily identifiable and should not contain action statements. The probability of missing an action step increases when it is included in a warning, note, or caution.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.i

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. This ensures that operators are alerted to necessary information before performing a procedural step.

DOE5480.19 Attachment I, 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).

DOE5480.19 Attachment I, 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.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.l

Limits and/or tolerances for operating parameters should be specified and should be consistent with the readable accuracy of instrumentation. Operators should not be required to perform mental arithmetic to determine if a specified parameter is acceptable.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.m

Acceptance criteria for surveillance or test procedures should be easily discerned, including tolerances and units. If calculations are needed to compare data to acceptance criteria, the calculations should be clearly explained.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.n

Sequence of procedural steps should conform to the normal or expected operational sequence. Training on this sequence, reinforced with procedures that show the same sequence, will serve to improve operator performance by development of patterns of action that are more easily remembered.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.o

Procedures should be developed with consideration for the human-factor aspects of their intended use. For example, references to components

1.0 MANAGEMENT SYSTEMS

should exactly match drawing and label-plate identifiers, units should be the same as those marked on applicable instrumentation, and charts and graphs should be easily read and interpreted. Important factors (such as operating limits, warnings, cautions, etc.) should be highlighted.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.p

Emergency operating procedures should provide guidance in responding to single and multiple casualties.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.q

Portions or steps of other procedures that are used or referred to when performing a procedure should be specifically identified within the procedure so that operators will not be confused when transferring between procedures.

DOE5480.19 Attachment I, Chapter XVI, Section C.2.r

Component or system shutdown and restoration requirements following shutdown or a surveillance or test activity should be specific and controlled by the procedure.

1.2.2.1.1 Review Processes for Policies and Procedures

DOE5480.19 Attachment I, Chapter XVI, Section C.4, Paragraph 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.

1.2.2.1.2 Verification of Technical Procedures

DOE4330.4B Chapter II, Section 6.3.2, Paragraph 1, Sentences 1 thru 3

Verification is a review to ensure the proper format and technical accuracy of a new or revised procedure. This review should ensure that the format incorporates human-factors principles and other appropriate administrative policies. The technical accuracy review should also include a review of the procedure against the design requirement for that system or component.

DOE4330.4B Chapter II, Section 6.3.2, Paragraph 2

Verification should be conducted by one or more reviewers who were not involved in writing the procedure. Other disciplines such as health physics and operations should be considered for the review process.

1.2.2.1.4 Independent Safety Review Criteria and Process

DOE5480.19 Attachment I, Chapter XVI, Section C.4, Paragraph 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.

1.2.2.2 Approval Processes for Policies and Procedures

DOE4330.4B 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.

DOE5480.19 Attachment I, Chapter XVI, Section C.4, Paragraph 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.

1.0 MANAGEMENT SYSTEMS

1.2.3.1 Controls for Procedure Use

DOE5480.19 Attachment I, Chapter XVI, Section C.7, Paragraph 1

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.

DOE5480.19 Attachment I, Chapter XVI, Section C.7, Paragraph 2

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.

1.2.3.2.1 Change Processes for Procedures

DOE5480.19 Attachment I, Chapter XVI, Section C.3

Procedure changes and revisions are necessary to ensure that procedures reflect current operating practices and requirements. The review and approval process for each procedure change or revision should be documented. For the purpose of these guidelines, a "procedure change" refers to an on-the-spot change (whether for permanent or for one-time-only use). 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:

DOE5480.19 Attachment I, Chapter XVI, Section C.3.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.

DOE5480.19 Attachment I, Chapter XVI, Section C.4, Paragraph 2

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. For this purpose, management could be interpreted to mean the operations supervisor or a more senior individual within the operating organization. Within 2 weeks, these procedure changes should be concurred with by the individuals who would normally approve a revision or the Initial version of the procedure. Changes that alter the intent of a procedure should receive the same approval as a new or revised procedure.

1.2.3.2.2 Change Process for Procedures

DOE5480.19 Attachment I, Chapter XVI, Section C.3.b

Appropriate procedure changes and revisions should be initiated when procedure inadequacies or errors are noted.

DOE5480.19 Attachment I, Chapter XVI, Section C.3.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.

1.0 MANAGEMENT SYSTEMS

1.2.3.2.3 Review and Preservation of Key Procedure Steps

DOE4330.4B Chapter II, Section 6.3.6, Paragraph 1, Sentence 6

A method should exist to ensure that technical specification and other commitments are not inadvertently changed or deleted in the process of revising procedures.

DOE5480.19 Attachment I, Chapter XVI, Section C.3.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 over-looked.

1.2.3.3 Processes for Procedure Reviews Subsequent to Initial Issue

DOE4330.4B Chapter II, Section 6.3.6, Paragraph 1, Sentences 1 thru 3

Responsibilities for procedure program administration should be clearly defined. Procedures should be controlled in accordance with facility administrative requirements. All procedures should be periodically reviewed (e.g., every 2 years or prior to use for infrequently used procedures) for changes affecting content (such as reference material revisions, permanent incorporation of changes, incorporation of industry and in-house experience) and for philosophy and format enhancements and human-factors considerations. Checklists for the review should be utilized to ensure the scope and depth of the review is consistent and adequate.

1.2.4 Records Generated During Policy and Procedure Development

DOE5480.19 Attachment I, Chapter XVI, Section C.3

Procedure changes and revisions are necessary to ensure that procedures reflect current operating practices and requirements. The review and approval process for each procedure change or revision should be documented. For the purpose of these guidelines, a "procedure change" refers to an on-the-spot change (whether for permanent or for one-time-only use). 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:

DOE5480.19 Attachment I, Chapter XVI, Section C.3.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 over-looked.

1.3.1 Issue Identification

10CFR 830 Part 120(c)(1)(iii)

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.

DOE4330.4B Chapter II, Section 14.3.6, Paragraph 3

In addition to routine inspections, all personnel should be responsible for the prompt identification, correction (if feasible), or documentation of facility condition and housekeeping deficiencies during the normal course of their duties.

DOE4330.4B Section 10.b, Sentences 1 & 2

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 performance, safety, or facility preservation. 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.

1.0 MANAGEMENT SYSTEMS

1.3.2.3 Issue Risk Management

DOE5480.29 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 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 falsifies ES&H related data; or
(6) Material misrepresentations to inspectors, auditors, or reviewers when performing official duties.

1.3.2.4 Project Prioritization

DOE5480.29 Chapter II, Section 7

EMPLOYEE ENVIRONMENTAL OR NUCLEAR SAFETY CONCERN PRIORITIZATIONS.
The significance of the concern is performed. Priorities for resolution shall be based on the determination of the risk of the concern. Generic guidance for safety significance is provided in paragraph 9 of this Order.

1.3.3.1 Root Cause Analysis

DOE4330.4B Chapter II, Section 17.3.3, Paragraph 1, Sentences 1 & 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.

1.3.3.2 Corrective Action Analysis

DOE5480.19 Attachment I, Chapter VI, Section C.5.d

Corrective Action Determination.
Appropriate corrective action should be established for each event investigation, and specific personnel should be assigned responsibilities for the corrective action. Corrective action can take the form of procedure changes, training, design modifications, and changes to administrative controls. The final approval for corrective action should be made by the facility manager.

1.4.1 New Requirement Review and Acceptance

DOE5480.23 Attachment I, Section 4.d(2)

All material associated with accident analyses or institution safety programs appearing in an SAR, including such assumptions, are to be taken as commitments to which the operating contractor proposes to adhere. The set of commitments must include facility-specific implementation of nuclear safety requirements. Examples of such commitments include TSRs, the Quality Assurance program plan, and the training program plan. Many commitments will constitute the working definitions of how the particular facility or operation proposes to comply with generic statutes, Federal rules, or DOE Directives.

DOE5480.23 Section 9.c

Periodic Updates of Safety Analysis Reports. Contractors shall be required to review and update as necessary, SARs annually, pursuant to this

1.0 MANAGEMENT SYSTEMS

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. The DOE approval of any Unreviewed Safety Question pursuant to DOE 5480.21, amendments to the TSRs, and the material submitted by the contractor to the PSO in support of these approvals shall be considered an addendum to the SAR until the information is incorporated into the SAR as part of the next annual update.

1.4.2 Interfaces With Regulators

DOE5480.23 Attachment I, Section 4.c(1)

Facility Authorization and DOE's Approval of SARs.
This Order makes reference to DOE authorization of facilities and to DOE's approval of SARs. DOE will employ SARs for new facilities and for safety-significant modifications of existing facilities as the principal safety basis for its decision to authorize construction and operation of nuclear facilities. For new facilities, authorization shall generally constitute approval of the FSAR and DOE may document its review with a Safety Evaluation Report (SER). DOE may decide to impose conditions of approval, which might include constraints on TSRs, or alterations to other commitments. The approved FSAR shall be understood to be the FSAR modified as necessary to reflect DOE-imposed conditions of authorization.

1.4.3 Integration and Exemptions

DOE5480.23 Attachment I, Section 4.d(1)

Commitments.
This Order requires that contractors carry out their responsibilities in accordance with the assumptions and commitments set forth in pertinent DOE-approved SARs. In other words, contractors are required to adhere to commitments made in SARs and to conduct operations in such a way that the assumptions made in the SAR are valid. Such assumptions may include, for example, assumptions in accident analyses about the initial conditions of facility operation that might be prevailing prior to an accident, and assumptions made in such institutional safety programs as qualit assurance, emergency planning, personnel training and maintenance plans, or surveillance programs. In general, such assumptions about plant conditions and modes of operation should define the outer bounds of the envelope of allowable facility operation. A safety margin should be employed in accident analyses to allow for uncertainties. This margin should be selected to allow for error in measuring how close to the limit of allowed operation the facility or operation is, together with an additional margin for the uncertainties in the accident analysis. Margins should be known, quantified, and documented in the SAR.

1.5.2 Performance Improvement Assessment

10CFR 830 Part 120(c)(3)(i)

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

DOE5480.19 Attachment I, Chapter I, Section C.3, Paragraph 5

Inspections, audits, reviews, investigations, and self-assessment are a part of the checks and balances needed in an operating program. 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, should periodically review and assess operation performance. These reviews can assist line managers and supervisors in identifying and correcting problems.

DOE5482.1B Section 9.c(1)

Functional appraisals shall be conducted by qualified specialists and involve the head as well as the staff of the organization being appraised.

DOE5482.1B 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.

DOE5482.1B Section 9.d(2) (a) thru (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.

1.0 MANAGEMENT SYSTEMS

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.

1.5.3 Performance Indicators

DOE5480.26 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.

1.5.3.1 Indicator Identification

DOE5480.26 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.

1.5.3.2 Indicator Trending and Analysis

DOE5480.19 Attachment I, Chapter VI, Section C.8

Event Trending

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.

DOE5480.26 Section 6.f(1)

Facility Managers as defined in paragraph of this order shall:

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

DOE5480.26 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.

1.0 MANAGEMENT SYSTEMS

1.5.3.3 Indicator Reporting

DOE5480.26 Section 7.a(1)

For all DOE facilities included in the DOE PI program, contractors shall provide their PI report addressing the specified list of Performance Indicators, provided in subparagraph c below, to the cognizant Field Organization, on a quarterly basis. For those facilities identified in Appendix 1 of DOE-STD-1048-92, which do not report to a Field Office, their quarterly report should be sent directly to the cognizant PSO.

DOE5480.26 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.

DOE5480.26 Section 7.a(4)

The quarterly contractor, Field Office, and PSO Performance Indicator reports shall follow the format and content provided in DOE-STD-1048-92.

1.6.1 Identification

DOE5000.3B Section 8.a.(1)

Occurrence Categorization and Notification Process.
The facility staff and operators shall identify and promptly notify the Facility Manager of abnormal events and conditions and record and archive all information pertaining to such occurrences.

1.6.2 Categorization

DOE5000.3B Section 7.a.(1)(2)(3)

Categorization.
Categorization of Reportable Occurrences shall be made as soon as practical and, in all cases, within 2 hours of identification. If categorization is not clear, then the occurrence shall be initially categorized at the higher level being considered and DOE notified in accordance with this Order. The occurrence categorization shall either be elevated, maintained, or lowered as information is made available. The categories of Reportable Occurrences are:
(1) Emergencies. Emergencies are the most serious occurrences and require an increased alert status for onsite personnel and, in specified cases, for offsite authorities. The detailed definitions, criteria, and classifications of emergencies and appropriate emergency responses to be taken are provided in DOE 5500.2B. The types of occurrences that are to be categorized as emergencies are:
(a) Any unintentional nuclear criticality that results or could result in actual or potential facility damage or release of radioactive material to the environment;
(b) Any actual or potential release of material to the environment which results or could result in significant offsite consequences;
(c) Any natural or man-made event posing an actual or potential threat to the integrity of the facility that results or could result in significant offsite consequences;
(d) Any event in process or having occurred which involves an actual or potential substantial degradation of the level of safety of the facility that results or could result in significant offsite consequences;
(e) Any safeguards or security event which is an actual or potential threat to DOE operations, facilities, or personnel, and results or could result in significant effects on the public health and safety and/or on national security; or
(f) Any event which requires activation of the site emergency plan.
(2) Unusual Occurrences. An unusual occurrence is a non-emergency occurrence that has significant impact or potential for impact on safety, environment, health, security, or operations. The types of occurrences that are to be categorized as unusual occurrences are those that:
(a) Result in the release of radioactive or hazardous materials above limits established in, or violation of, safety, environmental, or health requirements defined in Federal permits, Federal regulations, or DOE standards;
(b) Are significant internal or external threats to safety,environment, health protection, or the ability of a facility to operate;
(c) Involve significant degradation of safety class equipment or environmental, safety, security, or health conditions;
(d) Result in fatalities, exposures to hazardous or radioactive materials or offsite or onsite contamination that do not meet emergency criteria defined in DOE5500.2B, but are in excess of regulatory limits, failure of environmental monitoring equipment necessary to demonstrate

1.0 MANAGEMENT SYSTEMS

compliance, failure of safety equipment or systems reducing the capability below a minimum required safety function, or significant delay or cost in operations;
(e) Result in the actuation of emergency systems or engineered safety features, except under approved testing;
(f) Violate Technical Safety Requirements, (technical specifications, operational safety requirements), or involve an unreviewed safety question;
(g) Violate DOE safety requirements, environmental requirements, or result in the loss of control or release of radioactive material above allowable limits;
(h) Result in the release of a hazardous substance or material that exceeds a reportable quantity and is not federally permitted as defined in Attachment I; or
(i) Result in failure or significant degradation of administrative controls which are required to ensure safety, security, or environmental protection.
(3) Off-Normal Occurrences. Off-normal occurrences are abnormal or unplanned events or conditions that adversely affect, potentially affect, or are indicative of degradation in, the safety, security, environmental or health protection performance or operation of a facility. The types of occurrences that are to be categorized as off-normal occurrences are those that:
(a) Result in the release of radioactive or hazardous materials below limits established by Federal permits, Federal regulations, or DOE standards but that must be reported in writing to State or local agencies in other than routine monthly/quarterly reports;
(b) Are internal or external threats to safety, security, environmental, or health protection or the ability of a facility to operate;
(c) Involve degradation of environmental, safety, security, or health conditions;
(d) Result in serious personnel injury or significant lost workdays; personnel contamination, assimilation, exposure, or significant onsite or offsite contamination of hazardous or radioactive materials in excess of administrative limits but within regulatory limits; or degradation of environmental monitoring equipment necessary to demonstrate compliance;
(e) Result in violation of safety, environmental, or health administrative limits;
(f) Involve operational procedural violations, including maintenance and administrative procedures which have the potential to impact the safety, security, environmental or health performance, or operation of a facility; or
(g) Involve discovery of a condition that could prevent the functioning of administrative controls necessary to ensure safety or environmental protection.

DOE5000.3B Section 8.a.(3)

The Facility Manager shall categorize the occurrence as required in Paragraph 7a of this Order utilizing the facility specific procedures developed in accordance with Paragraph 8d(2) of this Order. For occurrences resulting from and directly related to a previously identified cause which is currently documented in a nonfinalized Occurrence Report, the Facility Manager, with concurrence from the Facility Representative and Program Manager, may submit a 10-Day Update Report in lieu of a new Occurrence Report.

RLID5000.3B Section 8.3.1

Categorization.
Categorization of RO's shall be made as soon as practical and, in all cases, within two hours of identification. If categorization is not clear, then the occurrence shall be initially categorized at the higher level being considered and notifications made in accordance with DOE 5000.3B.

For occurrences resulting from and directly related to a previously identified cause which is currently documented in a non-finalized OR, the Facility Manager, with concurrence from the Facility Representative and Program Manager, may submit a 10-day Update report in lieu of a new OR.

1.6.3 Notification

DOE5000.3B Section 7.b.(1)(2)(3)(4)

Notification.
The emphasis for both oral and documented notifications is on providing clear and succinct descriptions of the occurrence, and brief, concise descriptions of both the operating conditions of the facility at the time of the occurrence and the immediate actions taken, including results, if known. Requirements for oral and documented notification of Reportable Occurrences are as follows:

(1) Emergencies. Oral notification to DOE and offsite authorities of emergencies shall be made within 15 minutes or less of categorization. However, recognizing that the majority of, if not all, emergency occurrences will result in generating external interest, oral notification to DOE

1.0 MANAGEMENT SYSTEMS

should be accomplished as soon as possible. Emergency criteria are defined by DOE Order 5500.2B. Facility implementation procedures for DOE Order 5500.2B should identify the specific criteria for emergencies. These should be included or referenced in the facility specific procedures developed as required by Paragraph 8d of this Order. If the requirements of DOE Order 5500.2B have been implemented, then all oral notification requirements shall be satisfied in accordance with DOE Order 5500.2B. A Notification Report shall be prepared and submitted 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).

(2) Unusual Occurrences. Oral notification to DOE of unusual occurrences shall be as soon as sufficient information is obtained to indicate the general nature and extent of the occurrence but, in all cases, within 2 hours of categorization. However, oral notification to DOE should be accomplished as soon as possible for those occurrences judiciously determined to likely generate external interest. A Notification Report shall be prepared and submitted before the close of the next business day from the time of categorization (not to exceed 80 hours).

(3) Off-Normal Occurrences. For off-normal occurrences, oral notification to DOE is not mandatory; however, a Notification Report shall be prepared and submitted before the close of the next business day from the time of categorization (not to exceed 80 hours).

(4) Categorization Changes. Any changes in categorization shall be documented in a 10-Day Occurrence Report and submitted before the close of the next business day from the time of recategorization (not to exceed 80 hours). A justification for the new categorization shall be included in the report.

DOE5000.3B Section 7.c.

Follow-up Notification. In addition to the initial oral notifications required in Paragraph 7b, follow-up oral notification shall also be made to DOE for any of the following:

(1) Any further degradation in the level of safety of the facility or other worsening conditions, including those that require the declaration of any emergency class as defined by DOE Order 5500.2B, if such a declaration has not been previously made;

(2) Any change from one emergency class (as defined in DOE Order 5500.2B) or category (as defined by this Order) to another; or

(3) Termination of an emergency.

DOE5000.3B Section 8.a.(4)

(4) The Facility Manager shall be available at all times to carry out the requirements of this Order.

DOE5000.3B Section 8.a.(5)

For oral notification, the Facility Manager shall simultaneously contact the DOE Facility Representative and the Headquarters (HQ) Emergency Operations Center (EOC) through which the DOE Program Manager and any other necessary program staff can be located and direct communications links with the Facility Manager established. The HQ EOC function here is to facilitate communications within line organizations and to record and archive conversations. To facilitate this archival function, the oral notification shall include as many of the required report fields [see discussion in Attachment II, Section 1, regarding Fields 1-18 identified with an asterisk (*)] as known at the time of the oral notification with particular emphasis on clear and succinct descriptions of the occurrence (Field 15); brief, concise descriptions of the operating conditions of the facility at the time of the occurrence (Field 16); and immediate actions taken, including results, if known (Field 18). The Facility Manager may use the local Field/Site EOC to expedite establishing the direct communication link required above. To promote common understanding, the use of jargon should be avoided and uncommon or facility/ site-specific abbreviations and acronyms should be fully described in oral notifications and spelled out in subsequent written reports.

DOE5480.19 Attachment I, Chapter VII, Section C

1. Notification Procedures

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

a. Specific responsibilities for notifications;

1.0 MANAGEMENT SYSTEMS

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.

2. Notification Responsibility

The operations supervisor should ensure that all appropriate personnel receive notification when required. The actual notification of specific individuals or agencies may be accomplished by other individuals.

3. Names and Phone Numbers

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.

4. Documentation

All notifications should be documented. Fill-in-the-blank forms for different types of situations might be useful as a checklist and for providing necessary documentation. In any case, a formal record of notifications should be maintained.

5. Communication Equipment

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

RLID5000.3B Section 8.3.2

Notification.
The Contractor Facility Manager shall make oral notification to the ONC Duty Officer for all reportable occurrences. If necessary, the ONC Duty Officer will assist the contractor Facility Manager in contacting the RL Facility Representative.

RLID5000.3B Section 8.3.2.a., Sentence 1

Emergencies.
Within 15 minutes of categorization of an emergency (per 5000.3B) or classification of an emergency (per DOE 5500.2B, Alert, Site Emergency or General Emergency), the Facility Manager will contact the ONC to facilitate simultaneous notification of the HQ Program Manager and the RL Facility Representative.

RLID5000.3B Section 8.3.2.b., Paragraph 2

Occurrences determined to likely generate external interest, must be communicated to the RL Facility Representative and Program Manager as soon as possible. The Facility Representative is responsible for timely notification to his chain of command for these occurrences.

RLID5000.3B Section 8.3.2.b., Sentences 1 & 2

Unusual Occurrences.
Oral notification from the Facility Manager to the ONC and the RL Facility Representative of UO's shall be made as soon as practical after categorization. The ONC shall establish a conference call between the Facility Manager, the appropriate RL Alternate Facility Representative and HQ-EOC within two hours of categorization.

RLID5000.3B Section 8.3.2.c., Paragraph 1

Off-Normal Occurrences.
Oral notification from the Facility Manager shall be made to the RL Facility Representative in advance of transmittal of the Notification Report.

1.0 MANAGEMENT SYSTEMS

Written notification shall be made by the end of the next business day, not to exceed 80 hours from the time of the initial categorization, utilizing the Notification Report as prescribed in DOE 5000.3B, Paragraph 7.b.

1.6.4 Investigation

DOE4330.4B Chapter II, Section 17.3.3, Paragraph 1, Sentences 1 & 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.

DOE5480.19 Attachment I, Chapter VI, Section C.9

Sabotage
Acts of known or suspected sabotage are a special case of event investigations. 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.

DOE5480.19 Attachment I, Chapter XI, Section C.3, Paragraph 2

To aid in event reconstruction, as much significant information as possible should be logged during emergencies and abnormal or unexpected events. However, logkeeping should not take precedence over controlling and monitoring the facility.

DOE5484.1 Chapter II, Section 1.c

Type C Investigations - shall be conducted by Department of Energy contractor personnel when their operations are involved and by Department of Energy personnel when Federal operations are involved. Standards for these investigations beyond those in this part shall be established by the individual management.

DOE5484.1 Chapter II, Section 1.e(1)

e. Submission of Type C Investigation Reports.

(1) All occupational injuries and illnesses shall be investigated to determine corrective action appropriate to minimize or preclude similar injuries and illnesses. A report shall be made on Form 5484.3, Supplementary Record of Occupational Injuries and Illnesses, Attachment 1, for occupational illnesses as defined by the occupational Safety and Health Administration, and for lost work day cases and nonfatal cases without lost work days as defined in 29 CFR 1904.

DOE5484.1 Chapter II, Section 1.e(2)

(2) All accidents involving Government-owned, -rented, or -leased vehicles (including Interagency Motor Pool vehicles) or privately owned vehicles while operated on official business shall be investigated and the number of such occurrences reported on Form 5484.4, Tabulation of Property Damage Experience, Attachment 2. The investigation for each accident causing $250 or more damage and/or injury shall be recorded on SF-91A, Investigation Report of Motor Vehicle Accident, Attachment 3, and copies submitted to the System Safety Development Center (SSDC), EG&G Idaho, Inc., on or before the 25th of the
month following the end of the quarter in which the accident occurred.

DOE5484.1 Chapter II, Section 1.e(3)

(3) All accidents resulting in Department of Energy or other property damage or loss shall be investigated. The investigation for each loss exceeding $1000 shall be recorded on Form 5484.5, Report of Property Damage or Loss, Attachment 4, and copies submitted to the System

1.0 MANAGEMENT SYSTEMS

Safety Development Center (SSDC), EG&G Idaho, Inc., on or before the 25th of the month following the end of the quarter in which the accident occurred.

DOE5484.1 Chapter II, Section 1.e(4)

(4) All radiation exposures of individuals which in one calendar quarter exceed the following shall be reported by memo to the Operational and Environmental Safety Division:

(a) 3 rem to whole body.

(b) 5 rem to skin of whole body or thyroid.

(c) 10 rem to forearms.

(d) 25 rem to hands or feet.

DOE5484.1 Chapter II, Section 2.b(1)

1) General. The investigation report shall consist of, but is not limited to, four sections: summary, facts, analysis, and conclusions.

(a) The summary is a brief account of the essential facts of the occurrence and the investigators' conclusions. The facts section consists of a recitation of the factual information determined in the course of the investigation. It should relate the "who, what, when, where, why, and how," of the occurrence. The analysis section of the report is based on the factual information developed and consists of the reasoning of the investigators which support the conclusions. The conclusions section consists of the findings, the probable causes of and contributing factors to the occurrence, and the
judgments of needs.

(b) The investigation report shall fully cover and explain the technical elements of the causal sequences of the occurrence and shall also describe the management systems which should have, or could have, prevented the occurrence, e.g., the hazard review system and the quality assurance program for safety, including the monitoring of actual operations.

(c) The investigators' recommendations for corrective actions to prevent a similar occurrence shall not be contained in the report but shall be included in the cover memorandum that transmits the investigation report to the appointing official.

1.6.5 Reporting

DOE5000.3B Section 7.d.

Occurrence Report Preparation.
An Occurrence Report shall be prepared for all Reportable Occurrences, according to the instructions provided in Attachment II, INSTRUCTIONS FOR COMPLETING AN OCCURRENCE REPORT. The submission of Occurrence Report information is required as follows:

(1) The Notification Report shall be prepared as required in Paragraphs 7b and 8a(10) of this Order;

(2) Within 10 working days of categorization, the contractor shall submit a 10-Day Occurrence Report utilizing the information available at that time;

(3) The 10-Day Occurrence Report shall be updated when significant new information is available and submitted as a 10-Day Update Report; and

(4) The Final Occurrence Report shall be prepared and distributed by the contractor in accordance with this Order when the cause of the

1.0 MANAGEMENT SYSTEMS

occurrences has been analyzed, root cause and contributing causes determined, corrective actions determined and scheduled, and lessons learned identified.

DOE5000.3B Section 7.e.(1)

At facilities where classified operations are not conducted and classified information is not generated, authorized classifier (AC) reviews of Occurrence Reports are not required. Similarly, at facilities where UCNI operations are not conducted and UCNI is not generated, review of the Occurrence Reports by a Reviewing Official is not required.

DOE5000.3B Section 8.a.(10)

The Facility Manager shall prepare and submit the Notification Report (fields 1 through 18 of the Occurrence Report), and distribute it to the DOE Facility Representative and Program Manager before the close of the next business day from the time of categorization (not to exceed 80 hours). When an unclassified Notification Report is submitted using the computerized DOE ORPS data base, Paragraph 8c(1) below, the distribution requirement is automatically satisfied.

DOE5000.3B Section 8.b.(1)(2)(3)(4)

(1) For every Reportable Occurrence, the Facility Manager shall determine and document in the Occurrence Report as soon as practical:

(a) The significance, nature and extent of the event or condition;

(b) The cause(s) of the event or condition, including the root cause, as appropriate; and

(c) The corrective actions to be taken to correct the condition and prevent recurrence.

(2) Within 10 working days of categorization, the Facility Manager shall submit an Occurrence Report in accordance with subparagraph (6) below. The 10-Day report shall include any updated information provided by the DOE Facility Representative in accordance with subparagraph (3) below. Complete information required in subparagraph (1) above should be available at that time for the majority of Reportable Occurrences. For recurring occurrences identified in 8a (3) above (after receiving the required concurrences), a 10-Day Update Report shall be submitted withthe new information by the close of the next business day from the time of categorization (not to exceed 80 hours).

(3) The DOE Facility Representative, in consultation with the DOE Program Manager, should provide the Facility Manager his or her assessment ofthe occurrence, initial and proposed corrective actions, follow-up by the contractor, and any other actions DOE has taken since the occurrence in a timely manner for inclusion in the Occurrence Report. If the computerized DOE ORPS data base is being used, the FacilityRepresentative's comments should be provided via the data base. The Facility Representative's comments are not mandatory.

(4) The Final Occurrence Report shall be prepared by the Facility Manager and submitted when the analysis of the occurrence has been completed, root cause(s) and contributing cause(s) finalized, corrective actions(s) determined and scheduled, and lessons-learned identified. This report shall be submitted to the DOE Facility Representative within 45 days of categorization of the occurrence. If the required analysis cannot be completed within 45 days, an update to the 10-Day Occurrence Report shall be submitted within the 45 days and shall include a detailed explanation of the delay and an estimated date for submittal of the Final Occurrence Report.

DOE5000.3B Section 8.b.(5)

(5) The Final Occurrence Report shall then be reviewed and approved by the DOE Facility Representative within 7 working days of receipt and forwarded to the Program Manager for approval when the information required in subparagraph (4) above is provided. The Program Manager shall review and approve the Occurrence Report within 14 days of receipt. The Program Manager should provide any comments on the final report at this time. If the computerized DOE ORPS data base is being used, the Program Manager's comments should be provided via the data base. The Program Manager's comments are not mandatory. If the Final Occurrence Report is not approved, then the report shall be returned to the Facility Manager with an explanation for the disapproval. The revised Final Occurrence Report shall be resubmitted within 21 days of disapproval. If it cannot be resubmitted within this time period, then an update to the 10-Day Occurrence Report shall be submitted within the 21 days and shall include a detailed explanation of the delay and an estimated date for resubmittal of the final report.

1.0 MANAGEMENT SYSTEMS

DOE5000.3B Section 8.b.(6)

The Occurrence Reports (10-Day and Final) shall be prepared by the Facility Manager and distributed to the Program Manager, the affected program self-assessment group, PSOs, the Heads of all Field Organizations, the DOE Facility Representative, Office of Nuclear Safety (NS-1), Office of Environment, Safety and Health (EH-1), all DOE Management and Operations (M&O) contractors, and the Office of Nuclear Safety Policy and Standards (NE-70). For those occurrences involving safeguards and security issues, copies of the Occurrence Reports should be provided to the Office of Security Affairs (SA-1). When unclassified Occurrence Reports (10-Day and final) are entered onto the DOE ORPS data base, Paragraph 8c(1) below, by the Facility Manager, the distribution requirement is automatically satisfied. Distribution of written classified reports shall be defined by the cognizant PSO based on a "need to know."

DOE5480.19 Attachment I, Chapter VI, Section C.6

Investigative Report
An investigative report should be prepared in a time frame 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. It is important that the lessons learned from an event investigation be shared with all appropriate personnel who could benefit from the lessons learned. For example, a problem with an operations procedure might also exist in another department's procedures.

1.6.6 Tracking

DOE5000.3B Section 8.b.(9)

(9) Contractors shall maintain the ORPS data base (Paragraph 8c(1) below) up-to-date on the status of Final Occurrence Report corrective actions. Status reports of all incomplete Occurrence Reports (not final) and incomplete corrective actions shall be available at any time from the ORPS data base.

DOE5000.3B Section 8.c(2), Paragraph 1

Utilization.
Contractors for each facility or group of facilities shall collect and disseminate to their personnel the operations information obtained from their facilities, other similar DOE facilities, and the lessons to be learned from this information. Each Facility Manager should adopt the use of trending and analysis of this information for early indication of deteriorating conditions. Corrective action should be taken for any identified deteriorating conditions. The Facility Manager, DOE Facility Representative, and DOE Program Manager should review the DOE ORPS data base to identify good practices and lessons learned from other facilities that can be used in his/her facility.

DOE5480.19 Attachment I, Chapter VI, Section C.8

Event Trending

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.

1.7.1 Startup & Restart of Facilities Operational Readiness Review & Readiness

DOE5480.31 Section 9.b(10)

The contractor will be required to satisfy all prestart findings of the DOE Operational Readiness Review prior to startup or restart of the facility.

RLID5480.31 Section 6.e

e. RL contractors with responsibilities for performance of ORRs and RAs shall be required to:

(1) Prepare an implementing procedure for use in performing startup and restart activities in accordance with this Implementing Directive.

(2) For ORRs, prepare POA for all contractor ORRs and submit them to the cognizant RL Line Management for review and approval prior to

1.0 MANAGEMENT SYSTEMS

conduct of the ORRs. POAs will be submitted for review and approval a minimum of five months prior to the anticipated start date of the contractor ORR.

(3) For RAs, prepare Readiness Plans for new starts, or as required by MOU for restarts, and submit it to the cognizant RL Line Management for review and approval a minimum of three months prior to the anticipated start date of the contractors RA.

(4) Notify RL of planned start-ups or restarts and proposed AA in accordance with this Implementing Directive.

(5) Conduct ORRs and RAs in accordance with the provisions of this Implementing Directive.

(6) Notify RL of readiness of the facility to startup or restart, after completion of the contractor ORR and RAs.

(7) Designate the Contractor ORR Team Leader assuring the Team Leader's independence from the facility.

(8) Designate the Contractor RA Team Leader assuring the team Leader's independence from the facility for new starts, or as specified in MOU for restarts.

(9) Provide a MOU for review and approval to the Assistant Manager RL when restarts of a facility do not require either an ORR or RA.

RLID5480.31 Section 7.1 Paragraph 1, Sentence 1

The RL and responsible contractor management shall ensure that new hazard category 1, 2, or 3 facilities or directed facilities shall be started up, and existing hazard category 1, 2, or 3 facilities or directed facilities which have been shutdown, shall be restarted, only after documented reviews of readiness have been conducted, and the approvals specified in this Implementing Directive have been received.

RLID5480.31 Section 7.2 Paragraph 1, Sentence 1

The RL and responsible contractor management shall ensure that new, less than hazard category 3 facilities shall be started up, and existing facilities which have been shutdown shall be restarted, only after documented reviews of readiness have been conducted, and the approvals specified in this Implementing Directive have been received.

RLID5480.31 Section 8.0 Paragraph 1

Quarterly, each responsible contractor shall identify to RL Line Management all facility new start and restart activities planned for the next two years. The responsible contractor shall provide a basic description of the facility/activity, identify the anticipated AA, for both the contractor and DOE, for each new start or restart action in accordance with this Implementing Directive requirements. (If the anticipated AA is not the same as required by this directive, the contractor shall provide justification as to why they believe this is acceptable.) This report will identify the hazard classification of the activity or facility in accordance with reference f (or existing hazard category and provide justification to the existing hazard category as to its comparison to hazard class), if the new start or restart is an ORR or RA (if the contractor anticipates that neither an ORR or RA is applicable to the startup or restart, they will justify this assumption), and the expected date of operation.

RLID5480.31 Section 8.1.n

n. The contractor will be required to perform its ORR after its line management certifies that the facility is ready to operate.

RLID5480.31 Section 8.2.d

d. Contractor management shall determine if a RA is required for startup of new facilities or restart of a facility, as well as recommend the level of involvement by RL using the requirements given below. If the recommendation for RL involvement does not meet these requirements the contractor shall provide a written justification for the appropriateness of this recommendation.

RLID5480.31 Section 8.2.g (1-5)

g. Requirements applicable to start-ups or restarts of facilities/activities involving RAs.

(1) A MOU between the contractor and RL AAs defining the means to be used by the team in determining the approach to be used by the RA team in documenting the facility's capability for safe startup or restart.

1.0 MANAGEMENT SYSTEMS

The MOU is the agreement between the contractor and the RL AA as to the level of review for an RA. The MOU shall contain the technical justification for doing an RA, the means of accomplishing the RA, and the AA for the RA. It shall also contain the scope of the RA and the prerequisites for the RA.

The means for performing the RA may be a pre-approved procedure, check list, lines of inquiry, or CRA based. The means is to be based on the graded approach of Attachment 10.10 and shall be documented in the MOU.

(2) A formal Readiness Plan and final report shall be prepared. The resolution of all findings from the RA shall be documented and maintained in the final report.

(3) For new starts of less than hazard category 3 facilities, the RA is a verification of line management having achieved readiness to startup the facility. Therefore, for new starts of less than hazard category 3 facilities, the prerequisite for starting the RA is that line management certifies that readiness has been achieved. The Readiness Plan approved by RL shall specify the prerequisites for starting the responsible contractor's RA. For the RL RA, as a minimum, the responsible contractor must have certified by formal correspondence that readiness to startup or restart the facility has been achieved, as documented by the responsible contractor RA.

(4) For restarts of facilities, both extended and routine, the RA is a verification of line management having achieved readiness to restart the facility. However, the extent of the verification by line management for both the contractor and RL shall be specified in the MOU.

(5) A graded approach shall be used and documented in the MOU for the determination of both contractor and RL involvement in the RA.

RLID5480.31 Section 8.2.i

i. The contractor and, when required by this RLID, the RL RA Readiness Plan shall be approved by the startup or restart authorities. RL line management shall provide the contractor Readiness Plan to the appropriate levels of RL management for approval and to the OSA for review and comment.

RLID5480.31 Section 8.2.1

1. The contractor will be required to perform its RA after its line management certifies that the facility is ready to operate.

1.7.1.1 Need Determination

DOE5480.31 Section 10.e(1)-(4)

Contractor shall be required to:
(1) Prepare implementing procedures for use in performing startup and restart activities in accordance with this Order;
(2) Prepare plans-of-action for all contractor operational Readiness Reviews and submit them to the cognizant operations Office for review prior to conduct of the Operational Readiness Reviews;
(3) Notify the cognizant Operations Office of planned Operational Readiness Reviews and Readiness Assessments;
(4) Conduct Operational Readiness Reviews and Readiness Assessments in accordance with the provisions of this Order;

1.7.1.2 ORR Team Organization and Responsibilities

DOE5480.31 Section 9.b(5)

(5) DOE line management shall appoint and ensure that contractor management appoints Operational Readiness Review teams in accordance with the following requirements. Operational Readiness Reviews shall be conducted by personnel qualified in the technical activities involved. The DOE and contractor Operational Readiness Review team leaders will determine and document qualifications of Operational Readiness Review team members. Qualification
and training requirements to ensure technical competence and assessment expertise of Operational Readiness Review team members are specified in the Operational Readiness Review Standard. To summarize these requirements, each Operational Readiness Review team member should be technically qualified, thoroughly familiar with the activity being reviewed and have experience or training in performance-based review techniques. The training requirements may indicate that the Operational Readiness Review team members visit the facility and/or review appropriate facility documentation prior to the start of the Operational Readiness Review to gain familiarization with the facility and any proposed

1.0 MANAGEMENT SYSTEMS

changes. The Operational Readiness Review teams shall not include as senior members individuals who are responsible for accomplishing the work being reviewed. Additionally, no Operational Readiness Review team member should review work for which he or she is directly responsible.

RLID5480.31 Section 8.1.i (1-6)

i.DOE line management shall appoint and ensure that contractor management appoints ORR teams in accordance with the following requirements.

(1) ORRs shall be conducted by personnel qualified in the technical activities involved.

(2) The DOE and contractor ORR team leaders will determine and document qualifications of the respective ORR team members.

(3) Team Members shall be technically qualified, thoroughly familiar with the activity being reviewed and have experience or training in performance-based review techniques.

(4) The training requirements shall indicate that the ORR team members visit the facility and/or review appropriate facility documentation, prior to the start of the ORR, to gain familiarization with the facility and any proposed changes, as applicable.

(5) The ORR teams shall not include, as senior members, individuals who are responsible for accomplishing the work being reviewed.

(6) Additionally, no ORR team member shall review work for which he or she is directly responsible.

RLID5480.31 Section 8.2.a

a. RL contractors shall conduct RAs in accordance with internal approved procedures.

RLID5480.31 Section 8.2.h

h. Line management and RA Team Leader will develop the breadth and depth of the RA, as specified in the MOU, and document it in the Readiness Plan. The minimum set of core requirements for ORRs should be addressed. The breadth and depth may be expanded at a later time by the RA team, if appropriate. The graded approach shall be applied to develop the depth of evaluation.

RLID5480.31 Section 8.2.j (1-5)

j. RL line management shall appoint and ensure that contractor management appoints RA teams in accordance with the following requirements.

(1) RAs shall be conducted by personnel qualified in the technical activities involved.

(2) The RL and contractor RA team leaders will determine and document qualifications of the respective team members.

3) Team Members shall be technically qualified, thoroughly familiar with the activity being reviewed and have experience or training in performance-based review techniques.

(4) The training requirements should indicate that the RA team members visit the facility and/or review appropriate facility documentation, prior to the start of the RA, to gain familiarization with the facility and any proposed changes, as applicable.

(5) No RA team member should review work for which he or she is directly responsible for new starts of less than hazard class 3 facilities, or as required in the MOU for all other RAs.

RLID5480.31 Section 8.2.k

k. The RA Team Leader is a senior individual (for RL RAs the team leader will be a DOE person) with the necessary qualifications for managin and conducting the RA. The basis of the qualifications should include:

* Technical familiarity with the activities and functional areas being reviewed

1.0 MANAGEMENT SYSTEMS

* Previous performance-based review experience or training
* Demonstrated leadership and managerial skills.

The RA team leader is responsible for overseeing the RA process, including:

* Defining RA team membership
* Planning, scheduling, coordinating, and conducting the RA Compiling or acquiring access to all necessary background information (e.g., description of process equipment and control measures)
* Acting as the team interface with management.

A key responsibility of the team leader is selection and qualification of the team members. Each team member should have the following qualifications, as defined and verified by the team leader:

* Technical knowledge of the area assigned for evaluation. The knowledge shall include working experience in the technical area.
* Knowledge of performance-based assessment processes and methods. This knowledge may be gained through experience as an auditor or inspector, or it may be gained through training and evaluated as acceptable by the team leader.
* Facility specific information, which may be gained through a combination of required reading and facility tours and presentations.

1.7.2 Plan of Action

DOE5480.31 Attachment 2

MINIMUM CORE REQUIREMENTS

Each of the core requirements listed below, as a minimum, must be addressed when developing the breadth of an Operational Readiness Review. Justification must be provided in the plan-of-action, prepared in accordance with paragraphs 9b(2) and (3) of this Order, if it is determined that a particular core requirement is not applicable or will not be reviewed. The plan-of-action may reference a timely, independent review which addressed the requirements in a technically sound manner to justify not performing further evaluation of a core requirement during conduct of an Operational Readiness Review.

A graded approach, defined in Attachment 1, will be used to determine the level of analysis, documentation, and/or actions necessary to evaluate the core requirements listed below or other core requirements In the defined breadth of the Operational Readiness Review. The minimum core requirements are as follows:

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

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);

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.

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 facilities and safety-related utility systems is established;

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 which monitor limiting conditions of operation or that satisfy Technical Safety Requirements. All systems are currently operable and in a satisfactory condition;

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;

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;

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;

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

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;

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

12. The implementation status for DOE 5480.19, CONDUCT OF OPERATIONS REQUIREMENTS FOR DOE FACILITIES, is adequate for operations;

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

14. A program is established to promote a sitewide 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;

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;

16. The technical and managerial qualifications of those personnel at the field organization and at 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);

17. The 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);

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;

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

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

DOE5480.31 Section 9.b(1)

Requirements Applicable to Startups or Restarts of Nuclear Facilities Involving Operational Readiness Reviews. A formal plan-of-action, Operational Readiness Review Implementation Plan, and final report shall be prepared. The resolution of all findings from the Operational Readiness Review shall be documented and maintained with the plan-of-action, Implementation Plans, and the final report.

DOE5480.31 Section 9.b(2)

Requirements Applicable to Startups or Restarts of Nuclear Facilities Involving Operational Readiness Reviews. The Operational Readiness

1.0 MANAGEMENT SYSTEMS

Review is a verification of line management having achieved readiness to startup or restart the facility. Therefore, the prerequisite for starting the Operational Readiness Review is that line management certifies that readiness has been achieved. The plan-of-action approved by DOE shall specify the prerequisites for starting the responsible contractor's Operational Readiness Review; the prerequisites shall address each core requirement of Attachment 2 determined to be applicable when developing the scope of the Operational Readiness Review. For the DOE Operational Readiness Review, as a minimum, the responsible contractor must have certified by formal correspondence that readiness to startup or restart the facility has been achieved as documented by the responsible contractor Operational Readiness Review. In addition, the DOE plan-of-action shall specify additional prerequisites such as certification of readiness to oversee facility operations by Operations Office and Headquarters management.

DOE5480.31 Section 9.b(3)

Requirements Applicable to Startups or Restarts of Nuclear Facilities Involving Operational Readiness Reviews. Line management will 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 Attachment 2, shall be addressed when developing the breadth of the Operational Readiness Review. The plan-of-action may reference a timely, independent review which addressed the requirement in a technically satisfactory manner to justify not performing further evaluation of a core requirement, or portion thereof, during conduct of the Operational Readiness Review. The breadth may be expanded at a later time by the Operational Readiness Review team, if appropriate. The graded approach, as defined in Attachment 1, may be applied to develop the depth of evaluation of the core requirements.

DOE5480.31 Section 9.b(4)

(4) The contractor and DOE Operational Readiness Review plans-of-action shall be approved by the startup or restart authorities defined in paragraphs 9a(4)(a), (b) and (c). DOE line management will provide the contractor and DOE plans-of-action to the Assistant Secretary for Environment, Safety and Health for review and comment and to other Departmental organizations which, because of the technical reasons for shutdown of a nuclear facility, may have to be involved in the restart activities. For example, if the facility was shutdown due to inadequate emergency planning procedures, the Office of Policy, Planning, and Program Evaluation should be involved. These Departmental organizations will then specify their office's desired involvement in the startup or restart activities.

DOE5480.31 Section 10.e(2)

Contractor shall be required to: (2) Prepare plans-of-action for all contractor operational Readiness Reviews and submit them to the cognizant operations Office for review prior to conduct of the Operational Readiness Reviews;

RLID5480.31 Section 8.1.h

h.The contractor and DOE ORR POA shall be approved by the startup or restart authorities. RL line management shall provide the contractor POA to the appropriate levels of DOE management, as required by reference h and for RL ORR to the OSA and the HQ EH representative. RL line management shall also submit the DOE POA to the AA, through normal channels, who will follow the above for the DOE POA.

RLID5480.31 Section 8.2.e

e. The contractor shall conduct a RAs in accordance with this Implementing Directive, when any of the following conditions occur:
   (1) Initial start-ups of new, less than hazard category 3 facilities.
   (2) Restart after an extended shutdown for less than hazard category 2 facilities. Extended shutdown is 12 months or greater.
   (3) Restart of less than hazard category 2 facilities after substantial plant or facility modifications required for future program work.
   (4) Restarts from routine shutdowns for all facilities.

1.7.3 Implementation Plan

DOE5480.31 Section 9.b(6)

Requirements Applicable to Startups or Restarts of Nuclear Facilities Involving Operational Readiness Reviews. The 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 in the Operational Readiness Review Implementation Plan. The Operational Readiness Review Implementation Plan is developed by the Operational Readiness Review team utilizing the approved Operational Readiness Review plan-of-action. Many of the elements for development of the Operational Readiness Review Implementation Plan are described in the Operational Readiness Review Standard.

1.0 MANAGEMENT SYSTEMS

DOE5480.31 Section 9.b(7)

Requirements Applicable to Startups or Restarts of Nuclear Facilities Involving Operational Readiness Reviews. The Operational Readiness Review Implementation Plan is approved by the Operational Readiness Review team leader and used by the Operational Readiness Review team leader to execute the Operational Readiness Review. The team leader will provide the Operational Readiness Review Implementation Plan to the Office of Environment, Safety and Health for review and comment for all startups and restarts and to other Departmental organizations for restarts when the reason for shutdown falls in their technical area of responsibility.

1.7.4 Implementation

DOE5480.31 Section 9.b(8)

Requirements Applicable to Startups or Restarts of Nuclear Facilities Involving Operational Readiness Reviews. The contractor will be required to perform its Operational Readiness Review after its line management certifies that the facility is ready to operate.

RLID5480.31 Section 8.1.l

l. When an ORR is deemed necessary, for a less than hazard class 3 facility or activity, the contractor shall prepare a MOU to define the means to be used by the team in determining the approach to be used by the ORR team in documenting the facility's capability for safe startup or restart. The MOU shall be approved by the RL AA.

1.7.6.1 Final ORR Report

DOE5480.31 Section 9.b(11)

Requirements Applicable to Startups or Restarts of Nuclear Facilities Involving Operational Readiness Reviews. Upon completion of the contractor or DOE Operational Readiness Review, a final report shall be prepared and approved by the Operational Readiness Review team leader. The final report will document the results of the Operational Readiness 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 any identified nonconformances or schedules for gaining compliance with applicable DOE Orders, Secretary of Energy Notices, and Standards/Requirements Identification Documents 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, or the environment. This conclusion will be based on:

(a) Review of the program to document conformance with applicable DOE requirements, including a process to address new requirements. This type of program may be a compliance review program, safety basis development program, or any other appropriate program documenting conformance with applicable requirements;

(b) Extensive use of references to DOE requirements in the Operational Readiness Review documentation. Additionally, there shall be a "Lessons Learned" section of the final report which may be applied to future Operational Readiness Review efforts. This section may be completed subsequent to facility startup or restart.

DOE5480.31 Section 9.b(13)

Requirements Applicable to Startups or Restarts of Nuclear Facilities Involving Operational Readiness Reviews. The final report will be submitted to the approval authority identified in paragraphs 9a(4)(a), (b), and (c) and used by the approval authority as a basis to grant approval of the start or restart of the nuclear facility.

RLID5480.31 Section 8.2.o

o. Upon completion of the contractor or RL RA, a final report shall be prepared and approved by the RA team leader. The final report will document the results of the RA and make a conclusion as to whether startup or restart can proceed safely. There shall be a statement in each new start RA final report as to whether any identified nonconformances or schedules for gaining compliance with applicable DOE Orders, Secretary of Energy Notices, and SRID have been justified in writing, have been formally approved, and in the opinion of the RA team, maintain adequate protection of the public health and safety, worker safety, or the environment.

Additionally, there shall be a "Lessons Learned" section of the final report, which may be applied to future RA efforts. This section may be completed subsequent to facility startup or restart.

1.0 MANAGEMENT SYSTEMS

RLID5480.31 Section 8.2.p

The mechanism for closure of RL RA prestart findings is defined in this Implementing Directive (see Attachment 10.7). This process includes:

(1) Development of action plans, approved by DOE, to correct the findings.

(2) Documenting completion of response actions corresponding to the findings in a closure package.

(3) DOE verification of closure of prestart findings. The organization verifying the closure will be designated by the Approval Authority.

RLID5480.31 Section 8.2.q

q. The final report will be submitted to the AA and used by the AA as a basis to grant approval for the start or restart of the facility.

1.7.6.2 Readiness to Proceed Memorandum

DOE5480.31 Section 10.e(5)

Contractor shall be required to: Notify the cognizant operations Office of readiness of the facility to startup or restart, after completion of the contractor Operational Readiness Review or Readiness Assessment.

1.8.1.1.1 Identification of Documents to Be Controlled

DOE/EH0135 TS.2.9

Up-to-date versions of procedures, manuals, and reference materials such as technical documents, drawings, and data sheets, are readily available, clearly identified, and technically accurate.

1.8.1.1.3 Distribution Lists

DOE5480.19 Attachment I, Chapter VIII, Section C.10

Distribution and Control of Equipment and System Documents
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.

DOE5480.19 Attachment I, Chapter XVI, Section C.6, Paragraph 1

A controlled copy of all operations procedures should be maintained in the control area for operator reference, and selected controlled procedures should be maintained at other appropriate locations. For example, controlled procedures for facility shutdown from outside the control area should be maintained at the remote shutdown location(s). It may be desirable to have procedures for routine evolutions available at local work stations.

1.8.1.2 Computer Use

DOE1330.1D Section 8.h

Each site will conduct systematic reviews to determine the need to update its own software management methodologies, policies, procedures, and conventions, including those related to the safeguarding of the software and its associated data from misuse. These reviews will assure that the appropriate computer security controls are in place and that they are effective and reflect currently accepted industry practices.

1.0 MANAGEMENT SYSTEMS

1.8.1.3.1 Records Management Plan

DOE1324.2A Chapter I, Section 4

MANAGEMENT PLANS. Information on DOE F 1324.10 is necessary for planning the systematic, regular disposition of records; this cannot be done without the initial inventory process. DOE and contractor organizations must assure all their records are inventoried and the inventories are kept current. Planning for disposition must not be delayed waiting for completion of the inventory of all records, however. The annual records management plan has to balance inventory and disposition efforts to maximize benefits. For example, it would be more beneficial to inventory, obtain disposition authority, and dispose of 10,000 cubic feet of discontinued files than to spend all the available time inventorying 50,000 cubic feet of records. A model management plan is under development and will be included as part of DOE 1324.5, RECORDS MANAGEMENT PROGRAM.

DOE1324.5A Section 8.b(3)

Formulate, continually update, and review at least annually a records management plan which will allow the appropriate approving(i.e., site management) or reviewing authorities(e.g., a DOE Field Office) to judge the comprehensiveness and effectiveness of the records management program. (See paragraph 8d, below, for a description of the records management plan.)

DOE1324.5A Section 8.b(9)

Develop and implement a process for institutionalizing a disaster recovery plan to ensure protection and preservation of records in the event of a disaster. The plan should be based upon an appropriate risk assessment process commensurate with the risk of loss and value of the records.

DOE1324.5A Section 8.c(5)

Records management plans are approved by appropriate management officials.

DOE1324.5A Section 8.d(1)(6)

A records management plan should reflect known program deficiencies; and also work efforts, action, or projects for correcting these deficiencies in accordance with priorities and available staff. Elements that are relative to the coverage of the plan and to the environment of the site should be included, as follows:

(1) Summary of management control process describing the records management program of the site. If special provisions apply to selected records management initiatives or records holdings, this information should be included.
(2) Reference to list(s) which uniquely identify assistant RMOs and the recordkeepers and their official file stations.
(3) Reference to schedules indicating any type of self assessments. Schedules should, at a minimum, indicate the fiscal year planned for such tasks.
(4) Reference to documents containing the results of the latest compliance review, and follow-up actions on previous recommendations from the review.
(5) Reference to a plan for continually providing records management program awareness and training to personnel who manage, design, develop, operate, maintain, or use records management. Plans for on-site personnel should include, as a minimum, training schedule, type of training, personnel attending, and date of attendance.
(6) Reference to lists which identify emergency response personnel and locations where they may be contacted.

1.8.1.3.2 Identification of Documents to Be Retained

DOE1324.2A Section 9.b

Identify and plan for the preservation of records documenting the organization, functions, policies, decisions, procedures, and essential transactions, including records containing evidence or information necessary for the protection of the rights of the Government and individuals.

DOE1324.3 Chapter I, Section 3

FILES PLANNING. Essential steps in developing a files plan consist of:

a. Identifying those records that are necessary to carry out assigned functions.
b. Determining where those records should be located.

1.0 MANAGEMENT SYSTEMS

c. Establishing the system under which those records are to be arranged.

1.8.2.1 Controls and Facilities for Records Storage

DOE1324.3 Section 5.a

Decentralization of Files.
(1) Departmental policy provides for the maximum feasible decentralization of file stations. This policy provides for placing file stations where they will be readily accessible to those who use them most often. This keeps as many records as practicable in small, usable collections. In small files the difficulty of finding a particular document is reduced because there are fewer papers to search through.
(2) Duplicate file stations consisting of extra copies or other nonrecord material should be established only when official stations are not readily accessible to another group which needs frequent reference to the records.

DOE1324.3 Section 5.b

Centralization of Files.
(1) Types of Files Best Suited to Centralization. Centralizing records often results in duplicate recordkeeping and less efficient use of space, personnel, and filing equipment. The practice, therefore, of centralizing files should be limited to those instances where there is a realistic need to centralize. Examples of realistic needs to centralize for documentation and control purposes are: certain regulatory files, official personnel files, construction project files, personnel security files, and contract files. Centralization also may be desirable when several organizational units require frequent reference to the same records.
(2) Location of Users. Records (file stations) should be reasonably close to regular users. Records located in the same room or in the general vicinity of the majority of users normally will provide convenient access. Users located in separate buildings or a considerable distance from the filing station they use will require duplicate files. These additional file stations should be authorized.

DOE1324.6 Section 15

RECORDS PROTECTION, PRESERVATION, AND ACCESS RESTRICTION. Special precautions may need to be taken to ensure the safekeeping of electronically stored data. Before establishing safeguards, the sensitivity of the data should be determined, vulnerabilities identified, and the degree of risk considered. A primary method for identifying and determining the most cost-effective means of protecting such data is through risk assessment, i.e., an orderly process through which potential adverse events can be identified, evaluated, and controlled so as to minimize loss or harm to informational assets. Also, the following items need to be considered:

a. The desirability of retaining a duplicate copy of data (records) as a backup in the event that a recovery should be necessary.
Backup copies should be stored in a different area to prevent possible destruction by the same source that destroyed the originals.
The organization that supplies software (e.g.,application packages) must be consulted to ensure compliance with copyright provisions before any software can be copied.
b. The necessity for requiring physical security, i.e., limiting physical access to the hardware, assuring fire protection, maintaining an inventory, prohibiting smoking, drinking, or eating near the hardware.
c. Procedures for using the equipment and records may need to be examined to ensure that only authorized persons have access. Provisions of the Privacy Act require the protection of sensitive information. The use of passwords is one technical method of minimizing the possibility of unauthorized access. However, passwords must be adequately protected.
d. Further protection may be afforded the data by using encryption equipment or software that can either transmit or store data in encoded form.
e. Unclassified, sensitive electronic records shall not be processed without the express written approval of the Computer Protection Program Manager in accordance with DOE 1360.2, page 5, paragraph 6c(1), which states: "For new or significantly changed sensitive computer applications, protection specifications must be reviewed and approved in writing by the Computer Protection Program Manager prior to commencing acquisition or programming action." Consult him or her also for any specific requirements for processing unclassified data applications, e.g., color coded or specifically marked diskettes. In the Computer Protection Program Manager must certify "That new or significantly changed sensitive computer applications are designed reviewed and system tested prior to operational use... Upon successful completion of the system test, the Computer Protection Program Manager shall certify that the system meets the documented and approved system protection specifications; related applicable Federal policies, regulations, and standards; and that the results of the test demonstrate that the protection provisions are adequate to safeguard the sensitive data processed."

1.0 MANAGEMENT SYSTEMS

1.8.2.2 Controls for Records Retrieval

DOE1324.3 Preamble, Section 5.a

Departmental files shall be organized so that needed records can be found rapidly, complete records are assured, the selection and retention of records of archival value are facilitated, and the disposition of noncurrent records is accomplished promptly. All services are to be performed with maximum economy in personnel, equipment, and supplies.

DOE1324.6 Section 11.a

RETRIEVING ELECTRONICALLY STORED RECORDS.
Personnel should be able to easily retrieve electronically stored records until their authorized disposition. This requirement is important when an automated system is upgraded or replaced with a new one. Records stored on the old system should be converted or the new system should be designed so that the records continue to be usable until their authorized disposition date. One possibility is to design systems that are compatible with a variety of other systems. An alternative is to contract with a commercial service that will convert records from one format to another

1.8.3.1 Controls for Records Retention and Storage Media

DOE1324.2A Attachment I, Section 27

RECORDS SCHEDULES. These are the means by which the disposition standards for records are published. The General Records Schedules issued by NARA, includes records relating to civilian personnel, fiscal functions, accounting, procurement, communications, printing, and common or housekeeping functions, and certain nontextual records. The Department of Energy Records Schedules,
issued by the Department, pertain to unique records not covered by the GRS, for which the Department has obtained NARA approval for their disposition. It is estimated that the GRS covers about one third of the records of the Department. The Department is responsible for preparing and revising separate schedules for all the records the GRS does not cover.

DOE1324.2A Chapter II, Section 2.a(2)

Organizational Unit Designation.

(a) Separate RIDS are prepared for each file station. For example, in an office services branch consisting of a mail section, a word processing section, a records management section, and a graphics section, each section has its own set of files constituting four separate file stations which require four separate RIDS, one for each file station.
(b) Responsibility for files maintenance and disposition actions must be assigned to an appropriate staff member.

DOE1324.2A Section 9.c

Develop a planned approach to retire or transfer records no longer required for current activities to lower cost storage with a preference for use of Federal Records Centers over local records holding areas.

DOE1324.5A Section 8.b(7)

Ensure that site-specific records retention and disposition schedules are developed, approved, and implemented.

1.8.3.2 Controls for Authorized Records Disposition

DOE1324.2A Chapter I, Section 3

IDENTIFY OR OBTAIN DISPOSITION AUTHORITY. The completed inventory is reviewed to determine the proper disposition authority for each filing series. The files described will fall into one of the following categories:

a. Nonrecord material. This is disposed of when no longer needed.
b. Record material covered by the GRS or Department of Energy Records Schedule (DOERS). Filing series descriptions are compared to the item descriptions in the schedules. Where they match closely enough to determine coverage, the schedule and item number, are indicated in block 7 of DOE F 1324.10.
c. Record material not covered by existing schedules.

1.0 MANAGEMENT SYSTEMS

(1) Two situations are possible:

(a) The filing series description simply cannot be matched against any of the descriptions in the schedules, or
(b) They can be matched but the creator or holder of the records does not agree with the authorized disposition of those schedules.

(2) In either case, DOE F 1324.5, "Request for Records Disposition Authorization," must be completed and submitted through the appropriate records officers to AD-242.

DOE1324.2A Chapter I, Section 6

OTHER CONSIDERATIONS.

a. Automatic Data Processing (ADP)/Electronic Records. ADP/electronic, machine-readable information is included in the statutory definition of records. Such records are described separately from hard copy records. This is done by entering a separate subitem on the DOE F 1324.10 to show the filing series is also in an electronic media (e.g., tape or disc). As long as they generally duplicate hard copy records, they have the same disposition. However, they are inventoried separately and their disposition is to be shown.

b. Micrographics. This includes those means of reducing the size of hard copy records, such as microfiche and microfilm. There are instances when reducing records by these means is a sound course of action. Each such project of significant size requires a cost-benefit study to assure the project is clearly to the advantage of the Government when purchase of a micrographic system is contemplated. These copies have to be adequate substitutes for the hard copies they are replacing, and be readable and usable for the approved retention period of those hard copy records. Note that approval of NARA is required if the project involves microfilming of permanent records. Local approval is permitted for temporary records. Once quality control checks are completed on the films, the hard copy records should be disposed of.

c. Classified Records Disposal. Classified documents (records) are scheduled just like unclassified records. While accountability for Secret and Top Secret records is required, the protection of all classified records (including Confidential records) involves high costs in manpower, space, and filing equipment. The disposition of accountable documents involves special effort because of security requirements. Vigorous efforts are to be made to assure compliance with disposition authorities. Nonrecord and extra copies of classified documents are promptly disposed of when no longer needed. DOE 5635.1A, CONTROL OF CLASSIFIED DOCUMENTS AND INFORMATION, of 2-12-88, contains the security requirements and procedures for these documents. Classification of the records is to be indicated on the DOE F 1324.10 to aid in complying with the procedures in DOE 5635.1A.

d. Unclassified, Sensitive Information. This category of records includes Unclassified Controlled Nuclear Information (UCNI) Naval Nuclear Propulsion Information (under the cognizance of NE-60), Export Controlled Information, Official Use Only Information, and a variety of other sensitive information on which controls are placed by organizations. No attempt will be made to comply with the numerous requirements for the handling, including special markings, of these records in records holding areas or in Federal Records Centers. However, where these types of records are recalled by their custodial office or organization it is incumbent on that office to comply with the requirements in Departmental regulations or directives, such as DOE 5635.4, PROTECTION OF UNCLASSIFIED INFORMATION, of 2-3-88. No action on these records will be taken by records personnel.

DOE1324.2A Chapter II, Section 2.d

Using RIDS.

(1) The approved RIDS is the basic document in the management plan. They are to be reviewed, analyzed, and compiled at records officer level, i.e., each Departmental and M&O contractor records officer will have a plan for their records management activities, based on the RIDS.

(2) Some considerations in using RIDS are as follows:

(a) Records are to be disposed of no later than 1 year from their authorized disposal dates (records material disposal dates are stated as the minimum periods of time which records must be retained).
(b) Nonrecord material should be disposed of prior to but no later than the scheduled disposal date (nonrecord material disposal dates are construed as maximum, rather than minimum, periods).

1.0 MANAGEMENT SYSTEMS

(c) Disposal and transfer of inactive records are accomplished on a regular basis; coordination with the servicing FRC is required prior to transfers of such records;
(d) An expedited timetable is necessary if records accumulate rapidly; and
(e) Given careful planning, actions under the management plan are scheduled as much as possible so as not to interfere with current operations.

1.9.1 Identification and Evaluation of Lessons Learned

DOE5000.3B Section 8.c(2), Paragraph 1

Utilization.
Contractors for each facility or group of facilities shall collect and disseminate to their personnel the operations information obtained from their facilities, other similar DOE facilities, and the lessons to be learned from this information. Each Facility Manager should adopt the use of trending and analysis of this information for early indication of deteriorating conditions. Corrective action should be taken for any identified deteriorating conditions. The Facility Manager, DOE Facility Representative, and DOE Program Manager should review the DOE ORPS data base to identify good practices and lessons learned from other facilities that can be used in his/her facility.

DOE5480.19 Attachment I, Chapter VI, Section C.8

Event Trending

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.

DOE5480.26 Section 6.f (2)

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

Identify lessons-learned and good practices that can be used to improve facility operations.

DOE5480.26 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.

1.9.2 Distribution and Incorporation of Lessons Learned

DOE5000.3B Section 8.c(2), Paragraph 1

Utilization.
Contractors for each facility or group of facilities shall collect and disseminate to their personnel the operations information obtained from their facilities, other similar DOE facilities, and the lessons to be learned from this information. Each Facility Manager should adopt the use of trending and analysis of this information for early indication of deteriorating conditions. Corrective action should be taken for any identified deteriorating conditions. The Facility Manager, DOE Facility Representative, and DOE Program Manager should review the DOE ORPS data base to identify good practices and lessons learned from other facilities that can be used in his/her facility.

DOE5480.19 Attachment I, Chapter VI, Section C.6

Investigative Report
An investigative report should be prepared in a time frame 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. It is important that the lessons learned from an event investigation be shared with all appropriate personnel who could benefit from the lessons learned. For example, a problem with an operations procedure might also exist in another department's procedures.

DOE5480.19 Attachment I, Chapter VI, Section C.7

Event Training

1.0 MANAGEMENT SYSTEMS

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. In some cases, due to the severity or possible safety consequences of some events, it is appropriate to train shift operations personnel on the event immediately. A mechanism should exist so that appropriate shift personnel could be immediately trained on an event when they next report for work.

DOE5480.19 Attachment I, Chapter VI, Section C.8

Event Trending

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.

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2.0 QUALITY ASSURANCE

2.0 QUALITY ASSURANCE

2.0 Quality Assurance

Quality Assurance Implementation Statement

The Requirements for this Functional Area of the K-Basins S/RID area found in the WHC Quality Assurance Program and Implementation Plan prepared in response to Title 10 WHC-SP-1131, Rev. 0. These requirements are not repeated here in an effort to preclude duplicating existing work. This implementation plan contains the citation of the requirement, description of how the requirement is implemented, and description of what corrective actions are planned to achieve compliance to the requirement.

3.0 CONFIGURATION MANAGEMENT

3.0 CONFIGURATION MANAGEMENT

3.1 Management and Administration

DOE-STD-1073-93 Chapter 1, Section 1.3.1.1

Configuration management program planning should include the following:

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

3.2 Technical Baseline

DOE4700.1 Chapter III.B.2.c.(3)

(a) Technical Baseline. The technical baseline should initially be developed with top level requirements based on mission needs and an assessment of existing available technology, and should become more detailed as the project progresses. Specifications should be prepared in accordance with specified standards. Attainable performance other required technical parameters should be established prior to commencement of development, construction, or fabrication.
(b) Engineering Data. Engineering data (e.g., design drawings, specifications) should be the primary source of performance requirements used in the design and production/construction of the system. Where possible, plans, reports, and other existing data items should be technical information may be made available to project participants.
(c) Traceability. It should be possible to track system requirements from a function to all of its elements; from an element to its functions; and, from a specific constraint. Traceability includes tracking requirements through the work breakdown structure between the system level and the lowest level of assembly requiring logistic or maintenance consideration.

DOE4700.1 Chapter III.C.2.b.(1)

Configuration Identification. Configuration identification is established in the form of technical documentation. With DOE review and approval, the technical baseline initially identified in the project plan is controlled, detailed, and updated through conceptual design, preliminary design (e.g., Title I), definitive design (e.g., Title II), and as-built drawings (e.g., Title III). Operations and maintenance manuals and specifications may be controlled separately or as part of the definitive design.

DOE4700.1 Chapter III.C.5.

a. Baselines can be revised several times during the life of a project. Insofar as performance measurement is concerned, the configuration of the end product represents the current technical baseline.
b. Functional Requirements Baseline is the initial technical baseline and is based on the functional requirements of the end product that are derived from the mission needs.
c. Technical Requirements Baseline is the basis for preliminary (Title I) design and is established at the completion of conceptual design. It consists of the documentation which describes the selected design approach and specifies its design and performance requirements.
d. Design Requirements Baseline is the collection of documentation which defines the preliminary (Title I) design. It is established at the completion of preliminary (Title I) design and is the basis for the definitive (Title II) design.
e. The final baseline is established when definitive (Title II) design is complete. It describes all the details of the design necessary for fabrication, assembly, construction, installation, and checkout of the facilities and equipment. It is composed of the specifications and drawings, quality assurance provisions, test procedures, and operations and maintenance manuals.
f. Project baseline management is completed with the execution of the project, but there is a continuing need to update the technical baseline during its operation. When a completed project goes into operation, there should be a set of "as-built" drawings which reflect the final configuration of the project. During operation, many changes will take place which will modify these drawings. It is the responsibility of the project manager to ensure that the operating contractor makes changes to the specifications and drawings, so that all"as-builts" remain current for the life of the facility.

3.0 CONFIGURATION MANAGEMENT

3.3 Change Control

DOE4700.1 Chapter III.C.2.b

Configuration Control.
Documentation may be changed as agreed to by DOE and as described in the contractor's configuration management plan. Contractor proposed changes should be screened by the contractor to determine whether DOE approval is required prior to implementation. If prior approval is required, the change shall be formally proposed to the project office prior to implementation. The project office will approve or disapprove the change or endorse and forward to the next higher board if the change exceeds the project office approval authority. If prior DOE approval is not required, the contractor may implement the change. The contractor's control system should:

(a) Permit identification of the status of a proposed change;
(b) Permit identification of the status of change implementation; and
(c) Provide an audit trail of change history.

DOE4700.1 Chapter III.C.2.b.(4)

Waivers and Deviations. The change process includes a procedure for converting change proposals to an approved waiver or deviation where conditions and potential cost benefits warrant. A deviation constitutes contractual relief prior to producing a product; a waiver constitutes contractual relief after producing the product.

DOE4700.1 Chapter III.C.4.b.(1)

Changes affecting the configuration of an item are to be limited to those which are necessary or offer significant benefits to the Department. Changes are required to:

(a) Correct deficiencies;
(b) Incorporate approved changes in operational or logistic support characteristics;
(c) Effect substantial life cycle cost savings; or
(d) Correct safety deficiencies.

DOE4700.1 Chapter III.C.4.b.(2)

The project office ensures that all data required for effective evaluation of changes are made available to those individuals responsible for change decisions. For example, an analysis of the effect caused by the change in the item's performance as prescribed in the configuration identification should be provided. Insofar as practicable, test data needed to validate claimed technical and economic advantages will also be included in this analysis. Every proposed configuration change affecting Departmental interests should be evaluated on the basis of the change criteria, including not making the proposed change. The evaluation should take into consideration all aspects of the change on the products or systems with which it interfaces and other contractors affected. Such aspects may include design, performance, cost, schedule, operational effectiveness, logistics support, transportability, and training.

DOE4700.1 Chapter V.C.2.h.(2)(d)

1 Change control procedures for both design and construction must be established early in the execution process. Delays in processing design changes can seriously affect the project progress. The planned or desired procedures should be included or referenced in the project management plan prior to the start of the execution phase. If consideration for contractor's method of change control is given and his method accepted, the modifications must be included in an update of the project management plan. The adopted procedures for changes should include rigid provisions for reporting the progress of changes timewise by the project manager's organization, in addition to the normal change control reporting provisions. Standard change controls procedures shall be established for projects not having specific project management plans. These procedures shall include authorities and responsibilities for changes during both design and construction.
2 Particular attention must be paid to the time when certain changes should be prohibited to allow completion of the work. Failure to establish design change procedures will almost guarantee delay of the project. During construction, the project manager should have the authority to prevent changes. During this period, changes should not be allowed unless they are operationally required, to meet safety requirements, and/ or result in cost savings.

3.0 CONFIGURATION MANAGEMENT

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4.0 TRAINING AND QUALIFICATION

4.0 TRAINING AND QUALIFICATION

4.1.1 Program Policy

10CFR 830 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.

10CFR 830 Part 120(c)(1)(ii)

Personnel Training and Qualifications. 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.

10CFR 830 Part 120(c)(3)(i)

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

DOE5480.20A Chapter I, Section 7.b Introduction, Sentences 1 & 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.

DOE5480.20A Preamble, Section 5

Policy and Objectives. DOE objectives are to ensure the development and implementation of contractor-administered training programs that provide consistent and effective training for personnel at DOE nuclear facilities. This Order contains minimum requirements that must be included in training and qualification programs. The requirements are based on DOE, NRC, and related industry standards, and are applicable to all operable DOE nuclear facilities. Because the operation of Department of Energy reactor and non-reactor nuclear facilities involves certain risks to employees, the public, and the environment, well trained and qualified operating organization personnel are of extreme importance. A vital element in ensuring a well trained and qualified work force is the implementation of a systematic approach to training (SAT). This approach has proven effective in the commercial nuclear power industry and in other major industries; therefore, the Department requires that training programs for personnel in the operating organization at DOE nuclear facilities are established using a systematic approach to training. Experience has also shown that the better operating nuclear facilities have well-defined, effectively administered policies and procedures to control the activities associated with personnel training. This Order requires the establishment and implementation of certain training-related procedures. Implementation of the requirements of this Order will meet 10 CFR 830.120, Criteria 2 - Personnel Training and Qualification.

DOE5480.20A Preamble, Section 6

a. This Order contains chapters that delineate general and specific requirements that apply to M&O contractor operating organization personnel. Chapter I contains requirements that have broad applicability for training and qualification of personnel at all operable nuclear facilities. Chapters II, III, and IV contain requirements for personnel at DOE Category A production, test, and research reactors, Category B reactors, and non-reactor nuclear facilities, respectively.

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

DOE5480.20A Preamble, Section 8.a

A Training Implementation Matrix shall be required and must be approved by the cognizant Operations Office for all new DOE reactor and non-reactor nuclear facilities prior to operations. The operating contractor shall meet the requirement of this Order to the extent possible prior to operation. The matrix shall be based on the status of existing compliance and shall include the time-frame for incremental implementation and full implementation of the requirements that are not being met at the time the facility begins to operate.

DOE5480.20A Preamble, Section 8.b

Contractors with an approved Training Implementation Matrix previously submitted in accordance with the 2-20-91 issuance of this Order shall be required to submit (as necessary) either an addendum or page changes to the Training Implementation Matrix to reflect the changes made as a result of the revision to this Order. Changes shall be submitted to the cognizant Operations Office for approval within 90 days from the issue

4.0 TRAINING AND QUALIFICATION

date of this Order.

WAC-173-303 Section 330(1)

Training program. The facility owner or operator shall 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 shall include those elements set forth in the training plan required in subsection (2) of this section. In addition:
(a) The training program shall 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;

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

(c) This program must be successfully completed by the facility personnel:

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

(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

(d) At a minimum, the training program shall familiarize facility personnel with emergency equipment and systems, and emergency procedures. The program shall include other parameters as set forth by the department, but at a minimum shall 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.

WAC-173-303 Section 330(2)

Written training plan. The owner or operator shall 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.

4.0 TRAINING AND QUALIFICATION

4.1.2 Training Organization Staffing and Training

DOE5480.20A Chapter I, Section 2

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 derived from other sources.

DOE5480.20A Chapter I, Section 4

Personnel Selection Requirements.

a. 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 ablility of the person to meet job performance requirements. Selection of operating organization personnel may involve a selection test.

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.

DOE5480.20A Chapter I, Section 5

Qualifications Process Requirements.
Qualification is defined in terms of education, experience, training, examination, and any special requirements necessary for performance of assigned responsibilities. The requirements in this Order are based on industry standards and are intended to provide reasonable assurance that personnel at DOE nuclear facilities possess qualifications to operate and maintain the facility safely and reliably under all conditions.

a. Operating organizations shall define 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.

b. Even though applied broadly to personnel in the operating organization, the term qualification has a different application for different positions. For example, managers and technical staff personnel may be considered qualified by virtue of meeting the entry-level requirements associated with the position and by completing applicable position-specifc training (see paragraph 7h and 7i). A comprehensive examination need not be administered to determine their qualification. Continuing training and professional development programs should be established to meet the needs of the individual and the position. Chapter 1, paragraph 7.d(1) contains requirements that shall be included in the continuing training program to the extent to which they apply to the position. Satisfactory performance of their assigned duties and assessment of individual performance such as that which is typically included in personnel performance appraisals may be used to document continued satisfactory performance.

c. Technician and maintenance personnel qualification shall include demonstrated perfomance 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). The

4.0 TRAINING AND QUALIFICATION

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 the maintenance of their qualification.

d.. 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 suitablility to perform assigned duties. Participation in the continuing training program descibed 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.

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.

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).

4.2 Administration of Training

DOE5480.20A Chapter I, Section 7.a(1)

(1) 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.

(a) Personnel who are appointed to positions in the operating organization subsequent to approval of the Training Implementation Matrix required by DOE 5480.20 of 2-20-91 shall meet the education and experience requirements of this Order. This excludes personnel who held positions prior to the approval of the Training Implementation Matrix from meeting the education and experience requirements stated for these positions.

(b) The Training Implementation Matrix should identify whether future persons selected for these positions will meet the education and experience requirements or include a request for an exception from the requirements for all future appointees if the requirement is deemed inappropriate on the basis of the hazard involved, the complexity of the operation, or the risk involved. This relief from the education and experience requirements does not, however, exclude these personnel from the training requirements identified in this Order for their job positions. Participation is required in job-specific training and qualification/certification programs and subsequent continuing training programs.

DOE5480.20A Chapter I, Section 7.c

Initial Training Requirements. An initial training program shall be established for operating organization personnel to develop or enhance their knowledge, skills, and ability to perform job assignments. Personnel in training shall not independently make decisions or take actions that could affect facility safety, nor shall personnel in training be placed in such positions. However, they may independently perform specific tasks or job assignments for which they are qualified.

4.0 TRAINING AND QUALIFICATION

4.2.1 Selection and Qualification

29CFR1910 Part 120(e)(5)

Qualifications for trainers. Trainers shall be qualified to instruct employees about the subject matter that is being presented in training. Such trainers shall have satisfactorily completed a training program for teaching the subjects they are expected to teach, or they shall have the academic credentials and instructional experience necessary for teaching the subjects. Instructors shall demonstrate competent instructional skills and knowledge of the applicable subject matter.

29CFR1910 Part 120(e)(6)

Training certification. Employees and supervisors that have received and successfully completed the training and field experience specified in paragraphs (e)(1) through (e)(4) of this section shall be certified by their instructor or the head instructor and trained supervisor as having successfully completed the necessary training. A written certificate shall be given to each person so certified. Any person who has not been so certified or who does not meet the requirements of paragraph (e)(9) of this section shall be prohibited from engaging in hazardous waste operations.

29CFR1910 Part 120(q)(7)

Trainers.
Trainers who teach any of the above training subjects shall have satisfactorily completed a training course for teaching the subjects they are expected to teach, such as the courses offered by the U.S. National Fire Academy, or they shall have the training and/or academic credentials and instructional experience necessary to demonstrate competent instructional skills and a good command of the subject matter of the courses they are to teach.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 616.1

Instructor Training and Qualifications. All instructors should be qualified in accordance with the contractor's site Instructor Qualification Program or possess equivalent qualifications.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 616.3

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

DOE/EH0256T(940431) 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.

DOE5480.20A Chapter I, Section 13a

a. Alternatives to Education. Educational requirements are described as either baccalaureate or associate degree, or high school diploma. In each case, the type of degree/diploma required is a function of the person's responsibilities. Persons who do not possess the formal educational requirements specified shall not be automatically eliminated where other factors provide sufficient assurance of their abilities to fulfill the duties of a specific position. These factors shall be evaluated on a case-by-case basis and approved and documented by the operating organization. The following are examples that may be considered in making the evaluation of an acceptable alternative to the educational requirements:

(1) General Education Development (GED) test for a high school diploma;

(2) Professional engineers license or completion of Engineer in Training (EIT) examination for a baccalaureate or associate degree requirement;

(3) Completion of technical portions of an engineering, engineering technology, or related science program may substitute for the baccalaureate or associate degree program. Successful completion shall be determined by a transcript or other certification by an accredited institution. For example, completion of 80 semester credit hours may be substituted for the baccalaureate requirement and 43 semester credit hours for the associate degree. The courses shall be in appropriate technical subjects relevant to the position to be filled; and

(4) Related experience may substitute for education at the rate of six semester credit hours for each year of experience up to a maximum of 60 credit hours.

4.0 TRAINING AND QUALIFICATION

DOE5480.20A Chapter IV, Section 2, Introduction

Entry-level requirements.
Entry-level requirements for operating organization personnel are intended to provide reasonable assurance that these personnel have, or can acquire, the knowledge and skills to operate and maintain the facility in a safe and reliable manner under all conditions. The following paragraphs describe the positions typically involved in the operation of non-reactor nuclear facilities, and the education and experience requirements for each. Attachment IV-1 summarizes the education and experience requirements for positions in this Chapter.

DOE5480.20A 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. Mangers 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 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).

DOE5480.20A 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, subparagraph 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 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

DOE5480.20A Chapter IV, Section 3

Medical Examination Requirements.
Operating contractor management shall determine the physical demands imposed upon operating organization personnel by the job tasks that are required to perform both routine and emergency functions. An initial medical examination shall be given to candidates and a reexamination shall

4.0 TRAINING AND QUALIFICATION

be given at least every two years to certified operators, fissionable material handlers, and certified supervisors to verify health and physical fitness to safely perform their assigned tasks. Certified operators, fissionable material handlers, and certified supervisors must also be cleared by medical examination prior to returning to work following any illness or injury which keeps the individual from performing his or her duties for a period exceeding one month. Medical examination requirements for other operating organization personnel shall be in accordance with operating contractor procedures.

4.2.2 Training Needs Assessment

29CFR1910 Part 119(g)(1)(i)

Initial training. Each employee presently involved in operating a process, and each employee before being involved in operating a newly assigned process, shall be trained in an overview of the process and in the operating procedures as specific in paragraph (f) of this section. The training shall include emphasis on the specific safety and health hazards, emergency operations including shutdown, and safe work practices applicable to the employee's job tasks.

29CFR1910 Part 119(h)(3)

Contract employer responsibilities.

(i) The contract employer shall assure that each contract employee is trained in the work practices necessary to safely perform his/her job.

(ii) The contract employer shall assure that each contract employee is instructed in the known potential fire, explosion, or toxic release hazards related to his/her job and the process, and the applicable provisions of the emergency action plan.

(iii) The contract employer shall document that each contract employee has received and understood the training required by this paragraph. The contract employer shall prepare a record which contains the identity of the contract employee, the date of training, and the means used to verify that the employee understood the training.

(iv) The contract employer shall assure that each contract employee follows the safety rules of the facility including the safe work practices required by paragraph (f)(4) of this section.

(v) The contract employer shall advise the employer of any unique hazards presented by the contract employer's work, or of any hazards found by the contract employer's work.

DOE5480.10 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.

DOE5480.20A Chapter I, Section 7.b Introduction, Sentences 1 & 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.

DOE5480.20A Chapter I, Section 7.b.(1)

The basic elements of a systematic approach to training include the following:

(1) A systematic analysis of the jobs to be performed.

Analysis typically involves the conduct of job analysis, needs analysis, or both; job analysis to determine tasks for training, and needs analysis to distinguish between actual and desired performance and to propose workable solutions. The analysis should include both normal and emergency duties. Program goals are then established and the scope of training program content is defined.

4.0 TRAINING AND QUALIFICATION

A graded approach should be used when analyzing jobs. For example, experience with the conduct of job and task analysis has shown that detailed methods such as those described in industry task analysis procedures or in the DOE Guidelines for Job and Task Analysis for Department of Energy Nuclear Facilities, DOE/EP-0095, are rarely needed. Rather, using qualified trainers and subject matter experts, more simplified methods can produce equivalent results as effectively and more efficiently. One method that can be used to conduct a job analysis is the table-top job analysis method.

This is a method where a team of trainers, subject matter experts (e.g.,qualified employees), and supervisors meet to identify duty areas involved in a specific job, tasks performed within each duty area, and tasks that should be included in the training program. The resulting task list typically ranges from the teens to approximately 250 tasks with the average being 125 - 150 for an operator or maintenance program. At non-reactor nuclear facilities where operator positions are sometimes more narrowly defined than a reactor operator job, the average is less. The verification and modification of task lists from similar facilities and jobs has also been found to be an effective method of job analysis. Similarly, table-top methods can also be used to derive learning objectives from task lists. These methods are less time consuming, more cost effective, and are usually self-validating.

Because of varied complexity and scope of job functions, the degree of analysis (needs analysis, job analysis, task analysis) necessary to define training program content will vary. For example, a job and needs analysis may be appropriate for operations and maintenance personnel, whereas a less formal broad-based assessment of training needs is appropriate for technical staff personnel. Job analyses need not be conducted for technical staff personnel. Consensus-based content guides should be used to assist with the determination of technical staff training program content. This method may also be sufficient to determine training program content for operating organization positions at many category 3 hazard nuclear facilities.

DOE5480.20A Chapter I, Section 7.b.(2)

The basic elements of a systematic approach to training include the following:

(2) Learning objectives derived from the analysis of the job that describe desired performance after training.

Learning objectives define the content of the training program. They are derived from task statements and represent the knowledge and skills necessary to perform the job. The objectives are organized into instructional units and sequenced to aid in the learning process. The objectives form the "blueprint" which guides the development of all training materials, tests, and strategies. Objectives are determined using one or more content analysis techniques. The most common techniques include verification analysis, document analysis, templating, detailed task analysis, or group brainstorming. In most cases the learning objectives, which address the knowledge and skills necessary to perform the task, can be developed directly from the task list and do not require additional analysis. A graded approach should be used to select the most effective technique for determining the learning objectives. For example, experience has shown that detailed task analysis is not necessary when good operating procedures exist or if improper performance of the task is of low consequence. Group brainstorming or a jointreview of the procedure by a trainer and a subject matter expert (SME) can produce acceptable results.

DOE5480.20A Chapter I, Section 7.b.(3)

The basic elements of a systematic approach to training include the following:

(3) Training design, development, and implementation based on the learning objectives.

Materials (e.g., lesson plans and OJT guides, training aids, and student materials) are developed to conduct training. The materials should reflect good instructional design and incorporate methods and activities that maximize knowledge and skill retention. Development of additional learning objectives, and in some cases, rewording of objectives also occurs. A graded approach should be used to develop training materials. For example, the training materials used to guide discussions with technical staff trainees could include a one-page outline of the lesson content that includes the key points and a student handout to distribute. The level of detail should take into account the job position and experience of the designated instructor. This approach may also be sufficient for much of the training that is conducted at category 3 hazard nuclear facilities. Training/Evaluation standards are also developed to provide guidance for on-the-job training. Additional activities include development of test items and examinations. Technical and instructional reviews of the products that are developed should be conducted. Recommendations

4.0 TRAINING AND QUALIFICATION

resulting from these reviews should be incorporated as necessary to assure that program content is both technically and educationally sound.

Program implementation consists of activities related to the actual conduct of training, as well as resource allocation, planning, and scheduling. Implementation requires assigning instructors and support staff, scheduling training and facilities, and conducting training.

DOE5480.20A Chapter I, Section 7.b.(4)

The basic elements of a systematic approach to training include the following:

(4) Evaluation of trainee mastery of the objectives during training.

Mastery of the learning objectives by the trainees should be evaluated periodically during the training. Evaluation methods include oral questioning, written examinations, performance of related tasks by the use of evaluation instruments (e.g., qualification standards, checklists, performance tests, job performance measures (JPM), or other similar methods). Evaluations should be content valid, administered consistently, controlled, and documented as appropriate to the level of assurance needed. Content valid examinations are examinations that accurately and consistently measure the associated learning objectives. A graded approach should be used during evaluation. For example, structured on-the-job familiarization can be used in lieu of formal on-the-job evaluation for managers, non-certified supervisors, and technical staff personnel. Much of the training for managers, non-certified supervisors, and technical staff personnel occurs in nontraditional settings such as discussions with individual managers. In addition, learning objectives for managers, non-certified supervisors, and technical staff personnel may not be readily adaptable to prescribed standards or quantitative testing. In such instances, qualitative evaluations are acceptable. For example, trainee mastery could be assessed from responses during discussions, behavior during role-playing, or material developed during training exercises. Qualitative evaluations may also be used to assess trainee mastery of learning at category 3 hazard nuclear facilities.

DOE5480.20A Chapter I, Section 7.b.(5)

The basic elements of a systematic approach to training include the following:

(5) Evaluation and revision of the training based on the performance of trained personnel in the job setting.

Evaluation provides the critical feedback loop to ensure the training is up to date and reflects the requirements of the job. Specifically, training programs are evaluated for program and lesson content adequacy, test adequacy, presentation adequacy, documentation adequacy, and post-training job performance. In addition, the operating performance of job incumbents should be monitored to determine individual strengths and weaknesses. The feedback received from the evaluation process is used to modify and improve program content and delivery. Program content should be periodically monitored and revisions should be made (as appropriate) to include changes in areas such as policies and/or procedures, system or component design, job requirements, regulatory requirements, and industry guidelines or commitments. Adjustments should also be made as a result of reviews of operating experience information such as Occurrence Reports, inspection reports, information notices, and bulletins. Feedback obtained from instructors, students, and supervisors is also reviewed for its potential impact on future training programs. The results are translated into action items or recommendations which are factored into program content.

4.2.3 Design and Development

DOE5480.20A Chapter I, Section 7, Paragraph 1

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. For example, the methods used to develop training programs and materials for personnel at category 3 (low) hazard nuclear facilities do not need to be as detailed or formally developed and implemented as some of the training programs and materials for the category 1 and 2 (higher-hazard) nuclear facilities because the nuclear safety-related risk to the work force, the environment, and the public is significantly less.

4.0 TRAINING AND QUALIFICATION

4.2.4 Implementation

DOE5480.20A Chapter I, Section 7.a(3)

(3) 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. The concept of training personnel as a team, stressing team communications and interaction, shall be used where job functions require team solutions and activities. For example, many facility normal and abnormal operations require interaction and coordination of duties among the operating personnel. In cases such as these, team training is necessary.

4.2.5 Evaluation

DOE5480.20A Chapter I, Section 7.a(2)

(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).

4.2.6 Facilities and Equipment

DOE/EH0135 TC.7.6

During laboratory or shop training, conditions of task performance, tools and equipment reflect the actual job to the extent possible.

4.2.7 Training Schedules

DOE/EH0135 TC.1.15

Training and retraining schedules are maintained to keep all personnel adequately qualified and/or certified.

DOE/EH0135 TC.11.4

The frequency of simulator/facility exercises and the practice time provided are adequate to maintain operating crew competency.

DOE/EH0135 TC.4.6

Verification that knowledge and practical abilities are maintained current is performed at least once every 2 years.
This verification includes the following:
- written examinations on basic technical knowledge and the application of this knowledge; and
- demonstration of radiological protection practical abilities for those individuals required to enter radiologically controlled areas who have not used these abilities as a part of their work.

4.2.8.1 Testing

DOE5480.20A Chapter I, Section 7.d(4)

Personnel who are responsible for developing and delivering training may be excused from continuing training for the area of primary administrative responsibility. For example, an individual who prepares, administers, and grades a written examination need not take the examination.

DOE5480.20A Chapter I, Section 8

Operator and Supervisor Examination Requirements.
Comprehensive written and oral examinations and operational evaluations shall be prepared and administered to demonstrate that certified operators and certified supervisor candidates possess the required knowledge and skills. Comprehensive witten examinations and performance demonstrations shall be administered to ascertain the qualification of other operator and supervisor candidates that includes duties that are important to engineered safety features as identified in the Safety Analysis Report. For certified Category A reactor facility certified personnel,

4.0 TRAINING AND QUALIFICATION

the oral examination shall be separate from the operational evaluation. Operational evaluations and oral examinations may be combined for certified 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 learning ojectives resulting from systematic analysis of the position. Examinations should include questions from sources such as Safety Analysis Reports, Technical Safety Requirements, system description manuals, operating procedures, Occurance Reports, and other applicable sources.

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

b. Oral examinations may be conducted as a one-on-one walkthrough or by an oral board or committee consisting of personnel identified by contractor facility management. The oral examination content shall be tailored to evaluate the candidate's operational knowledge (initial/continuing training program subjects) and organizational awareness (e.g., operating philosophy, use of procedures, shift and relief turnovers, verification of system/equipment status) to determine how the individual will function in an operating environment.

4.2.8.2 Qualification and Requalification

DOE5480.19 Attachment I, Chapter V, Section C.1

Adherence to Training Programs
On-shift training should be conducted in accordance with training programs that specifically identify items the trainee must accomplish on shift. The knowledge requirements for each item should be defined as well as what the trainee must do (perform, simulate, observe, or discuss). Both the instructor and the trainee should understand what is required for each training item.

DOE5480.19 Attachment I, Chapter V, Section C.4

Operator Qualification Program Approval
The operator qualification program should be approved by the operations supervisor, and changes to the program should be coordinated with the training department. For operating positions requiring certification, qualifications should be based on one-to-one instruction at that station.

DOE5480.20A Chapter I, Section 5, Paragraph 1

Qualification is defined in terms of education, experience, training, examination, and any special requirements necessary for performance of assigned responsibilities. The requirements in this Order are based on industry standards and are intended to provide reasonable assurance that personnel at DOE nuclear facilities possess qualifications to operate and maintain the facility safely and reliably under all conditions.

DOE5480.20A Chapter I, Section 5c

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).

DOE5480.20A Chapter I, Section 9, Sentences 1-3

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 adminstered to certified operators and supervisors.

DOE5480.20A Chapter I, Section 10

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 recertification.

4.0 TRAINING AND QUALIFICATION

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.

b. When a certified operator or supervisor has been absent from certification duties for greater than 3 months, but less than 12 months, selected retraining (including written and oral examinations and operational evaluations as deemed necessary) shall be given prior to reassignment to certification duties. The certification base date remains the same as it was before the absence. However, if the absence is greater than 12 months, comprehensive written and oral examinations and operational evaluations (as required of initial candidates) shall be given to determine weak areas. Retraining and re-examination shall be required in areas of weakness, and upon successful completion, a new certification date may be established.

4.2.8.3 Certification and Recertification

DOE5480.20A Chapter I, Section 6

Certification Requirements.
Certification is the process by which contractor facility management endorses and documents, in writing, the satisfactory achievement of qualification of a person for a position. Certification follows the completion of the qualification program for those positions identified as requiring certification. The notable difference between certification and qualification is that certification requires official contractor management endorsement of an individual's qualification to ensure senior management involvement in the qualification of key operations positions (i.e., operators and supervisors). Other significant differences between qualification and certification are the requirements associated with continuing training, examination, and reexamination for recertification.

a. The program leading to certification shall be governed by written procedures that include requirements for documented assessment of the person's qualifications through examinations and operational evaluations.

b. Certification may be granted only after all qualification requirements (including written and oral examinations and operational evaluations) and other specified requirements (e.g., medical examination) have been satisfactorily completed, and management has assured that the person is capable of safely performing all functions of the position. Satisfactory completion of qualifications which result in certification shall be verified by a person or group other than the candidate's immediate supervisor or the person/group that provided the training. Certification shall be valid for a period not to exceed years unless revoked for cause (e.g., medical disqualification, performance deficiencies, or failure to maintain proficiency).

c. Reactor operators and senior reactor operators at Category A and B reactors, and fissionable material handlers and fissionable material handler supervisors at non-reactor nuclear facilities shall be certified. For all other operators and their immediate supervisors, the operating organization shall identify in the Training Implementation Matrix any additional positions that will be certified (e.g., tritium facility operators, enrichment facility operators, tank farm operators, and their immediate supervisors).

DOE5480.20A Chapter IV, Section 4.d

d. Certified Operator Written Examination Contents. Written examinations shall be administered to certified operator candidates (fissionable material handlers and other positions that have been designated as certified, e.g., tritium facility operators, chemical process operators, waste tank operators, and enrichment facility operators). These examinations shall contain a representative selection of questions on the knowledge and skills identified from learning objectives developed from the analysis of the job and from information in Safety Analysis Reports, Technical Safety Requirements, system description manuals and operating procedures, lessons learned from Occurrence Reports, and other applicable sources. The examination shall include a representative sampling from the following items, in addition to the items listed in paragraph 4a, as appropriate to the position and to the facility.

(1) Facility control and safety systems, including design, principles of operation, components, functions, instrumentation, signals, interlocks,

4.0 TRAINING AND QUALIFICATION

failure modes, and automatic and manual features;

(2) Nuclear facility operating characteristics, and reasons for these operating characteristics, including causes and effects of temperature and pressure changes, and operating limitations;

(3) Principles of facility operation, including the process involved and technical terminology for the chemical, physical, and metallurgical reactions;

(4) Emergency systems, including components, functions, and limitations.

(5) Criticality safety principles, controls, and specifications.

(6) Radiation monitoring systems, including purpose, operation, alarms, and survey equipment alarms; and

(7) Radioactive and hazardous materials and effluent, including procedures, equipment, handling, and disposal.

DOE5480.20A Chapter IV, Section 4.e

e. Certified Supervisor Written Examination Contents. Written examinations shall be administered to certified supervisor candidates. These examinations shall be based on the sources discussed in paragraph 4d. The examination
shall include a representative sampling from the following items, in addition to those required for certified operators, as appropriate to the position and to the facility.

(1) Design, control, and operating limitations for the nuclear facility, including instrumentation characteristics and adjustment, nuclear facility operation, and nuclear facility console control mechanisms;

(2) Radiation hazards that may arise during the performance of experiments;

(3) Nuclear and radiation theory, including details of the fission process, neutron multiplication, source effects, and neutron poison effects;

(4) Procedures and limitations involved in initial equipment loading, alterations in fissionable material configuration, and determination of various internal and external effects on criticality safety;

(5) Procedures, equipment, and facilities available for handling and disposing of radioactive materials and effluent;

(6) Functions, assignments, and responsibilities of the maintenance and technical support organizations as related to nuclear facility safety; and

(7) Applicable portions of the facility Safety Analysis Report.

DOE5480.20A Chapter IV, Section 4.f

f. Operational Evaluations. The operational evaluations administered to certified operator, fissionable material handler, and certified supervisor candidates shall be generally similar in scope. The evaluation shall contain questions and operational exercises and shall include a facility walkthrough, and may include system and/or component operation. Operational evaluations, to the extent applicable to the facility, shall require the candidate to demonstrate an understanding of, and the ability to perform the actions necessary to accomplish a representative sampling from the following items:

(1) Perform prestartup procedures, including operating of controls associated with equipment which could affect criticality safety;

(2) Manipulate the controls as required to control the nuclear process between system or component shutdown and normal process operation;

(3) Identify annunciators and condition-indicating signals and perform appropriate remedial actions;

4.0 TRAINING AND QUALIFICATION

(4) Identify instrumentation systems and the significance of associated instrument readings;

(5) Observe and safely control the operating behavior characteristics of the facility;

(6) Perform control manipulations to obtain desired operating results during normal, abnormal, and emergency situations;

(7) Safely operate auxiliary and emergency systems, including controls of facility equipment that could affect criticality safety or release radioactive or other hazardous material to the environment;

(8) Demonstrate or describe the use and function of radiation monitoring systems, including fixed radiation monitors and alarms, portable survey instruments, and personnel monitoring systems;

(9) Demonstrate knowledge of significant radiation hazards, including permissible levels in excess of those authorized and ability to perform other procedures to reduce excessive radiation levels and to guard against personnel exposure;

(10) Demonstrate knowledge of the emergency plan, including, as appropriate, nuclear facility operator or supervisor responsibility to decide whether the plan should be executed and assigned duties under the plan;

(11) Demonstrate knowledge and ability, as appropriate to the assigned position, to assume the responsibilities associated with safe operation; and

(12) Demonstrate the ability to function within the facility or the control room as a team, as applicable to the facility and to the position, in such a way that procedures are adhered to and Technical Safety Requirements are not violated.

DOE5480.20A Chapter IV, Section 4.g

g. Control Manipulations. The operating contractor shall prepare a list of control manipulations that is based on an analysis of the job. Certified operator, fissionable material handler, and certified supervisor candidates shall perform control manipulations for initial certification and on a biennial basis as part of the continuing training program after certification is achieved. Certified supervisors need only supervise or direct the performance of control manipulations to satisfy this requirement. Supervision of the performance of control manipulations is consistent with the normal responsibilities of supervisors. However, there may also be situations in which the nuclear facility could require that a certified supervisor actually perform the control manipulation as part of initial certification if the operation requires in-depth knowledge of the supervisor to ensure that the operation is performed safely and correctly.

DOE5480.20A Chapter IV, Section 5

Operator, Fissionable Materials Handler, and Supervisor Proficiency Requirements. Certified operators, fissionable material handlers, and certified supervisors shall actively perform job functions associated with their certification to maintain proficiency. Actively performing job functions associated with certification means that the certified individual has a position on the shift crew, and that the individual carries out and is responsible for the day-to-day duties of the certified position. If certified operators, fissionable material handlers, or certified supervisors are absent from activities associated with the certified position for extended periods of time, their ability and readiness to perform at a high level of vigilance can reasonably be expected to decrease. The proficiency requirement is imposed to ensure that certified personnel continue to possess and practice the skills and abilities necessary to operate the systems and equipment for which they are responsible in a safe and reliable manner during both normal and abnormal facility operations and system transients.

a. The operating organization shall establish procedures which define requirements and frequency (e.g., 8 hours per month) necessary to maintain an active status.

b. If active status (proficiency) is not maintained, certification shall be suspended. Prior to resuming duties associated with certification, the operating contractor shall ensure that:

(1) Certification is otherwise current and valid; and

4.0 TRAINING AND QUALIFICATION

(2) The certified operator, fissionable material handler, or certified supervisor has performed certification duties under the direct supervision of a certified person, as appropriate to the position, for a specific period of time (e.g., 6 hours.)

c. If the nuclear facility is not operated frequently enough to meet established requirements, the operating contractor shall ensure that certification is reinstated prior to facility operation. Administering written and oral examinations and operational evaluations and conducting facility walkthroughs, cold operations, and/or simulated operations should be considered to ensure adequate operational knowledge (as determined by the duration of the facility shutdown). A graded approach should be used to determine the extent of activities necessary to reinstate certification. DOE 5480.31, STARTUP AND RESTART OF NUCLEAR FACILITIES, contains detailed requirements for facility restart.

WAC-246-292 Section 020(1)

(1) After January 1, 1979, all public water systems are required to have a certified operator if the system serves either:

(a) One hundred services at any one time; or
(b) Twenty-five or more persons which are supplied from a stream, lake or other surface water supplied from a stream, lake or other surface water supply source and which are required by law to use a water filtration system.

(2) Certified personnel shall be in direct responsible charge of the active daily technical direction and supervision of the following portions of affected public water systems;

(a) The entire public water system; or
(b) A major segment of a public water system necessary for monitoring or improving the quality of water provided separate individuals are assigned decision-making authority; or
(c) Shift supervisors, if shift work is practiced.

WAC-246-292 Section 090(1)

(1) The terms for all certificates shall be for one year from the date of issuance. Every certificate shall be renewed annually upon the payment of a renewal fee and satisfactory evidence presented to the board that the operator has demonstrated continued professional growth in the field. The accumulation of three college credits or continuing education units every three years is considered satisfactory evidence of professional growth.

4.2.10 Extension, Exceptions and Alterations

29CFR1910 Part 119(g)(1)(i)

Initial training. Each employee presently involved in operating a process, and each employee before being involved in operating a newly assigned process, shall be trained in an overview of the process and in the operating procedures as specific in paragraph (f) of this section. The training shall include emphasis on the specific safety and health hazards, emergency operations including shutdown, and safe work practices applicable to the employee's job tasks.

29CFR1910 Part 120(e)(9)

Equivalent training. Employers who can show by documentation or certification that an employee's work experience and/or training has resulted in training equivalent to that training required in paragraphs (e)(1) through (e)(4) of this section shall not be required to provide the initial training requirements of those paragraphs to such employees and shall provide a copy of the certification or documentation to the employee upon request. However, certified employees or employees with equivalent training new to a site shall receive appropriate, site specific training before site entry and have appropriate supervised field experience at the new site. Equivalent training includes any academic training or the training that existing employees might have already received from actual hazardous waste site work experience.

DOE5480.20A Chapter I, Section 11, Introduction

Exceptions to Training Requirements.
The initial training programs that are described in this Order were developed for persons assumed to have the entry-level knowledge and skills required of the position for which they are to fill, on the basis of meeting the education and experience requirements contained in this Order. Some candidates may already possess the necessary knowledge and skills for certain of their job requirements, and may be excepted from certain

4.0 TRAINING AND QUALIFICATION

areas of the training programs on the basis of prior education, experience, training, and/or testing. Testing (i.e., performance demonstrations, written examinations, oral examinations) is the preferred method for excepting persons from specific areas of training. In all cases, the requisite examinations (as described in paragraph 8)to establish qualification/recertification shall be completed.

DOE5480.20A Chapter I, Section 12

Extension requirements.
An extension of certification or qualification may be granted to persons on a case-by case basis in order to support operational and schedular commitments.

a. The operating organization shall establish an administrative procedure which addresses extensions to ensure timely completion of requirements associated with certification or qualification. This procedure should include as a minimum:

(1) Responsibility for approval of the extension;
(2) Length of extension;
(3) Explanation of circumstances that prevented the person from completing the requirements; and
(4) Description of the operational and/or schedular situation which necessitated the extension.

b. Extensions of certification of operators and supervisors shall be approved by the field organization. Extensions of qualification of other personnel shall be approved by contractor facility management.

DOE5480.20A Chapter I, Section 13a, Paragraph 1

Alternatives to Education. Educational requirements are described as either baccalaureate or associate degree, or high school diploma. In each case, the type of degree/diploma required is a function of the person's responsibilities. Persons who do not possess the formal educational requirements specified shall not be automatically eliminated where other factors provide sufficient assurance of their abilities to fulfill the duties of a specific position. These factors shall be evaluated on a case-by-case basis and approved and documented by the operating organization.

DOE5480.20A Chapter I, Section 13b

b. Alternatives to Experience . Experience in design, construction, and operational training may be considered applicable nuclear experience and should be evaluated on a case-by-case basis.

(1) Where course work is related to job assignments, post-secondary education may be substituted. Formal education shall not be allowed to substitute for more than 50 per cent of the experience requirement unless otherwise stated in Chapters II, III, or IV.

(2) Job-related training in the position sought may qualify as equivalent to nuclear experience on a one-for-one basis for up to a maximum of two years.

4.3.1.1 General Employee Training

29CFR1910 Part 38(a)(5)

Employee emergency plans and fire preventions. Emergency action plan. Training.

(i) Before implementing the emergency action plan, the employer shall designate and train a sufficient number of persons to assist in the safe and orderly emergency evacuation of employees.

(ii) The employer shall review the plan with each employee covered by the plan at the following times:

(A) Initially when the plan is developed,
(B) Whenever the employee's responsibilities or designated actions under the plan change, and
(C) Whenever the plan is changed.

(iii) The employer shall review with each employee upon initial assignment those parts of the plan which the employee must know to protect the

4.0 TRAINING AND QUALIFICATION

employee in the event of an emergency. The written plan shall be kept at the workplace and made available for employee review. For those employers with 10 or fewer employees the plan may be communicated orally to employees and the employer need not maintain a written plan.

29CFR1910 Part 38(b)(4)

Training

(i) The employer shall apprise employees of the fire hazards of the materials and processes to which they are exposed.

(ii) The employer shall review with each employee upon initial assignment those parts of the fire prevention plan which the employee must know to protect the employee in the event of an emergency. The written plan shall be kept in the workplace and made available for employee review. For those employers with 10 or fewer employees, the plan may be communicated orally to employees and the employer need not maintain a written plan.

29CFR1910 Part 94(d)(9)(i)

All employees working in and around open-surface tank operations must be instructed as to the hazards of their respective jobs, and in the personal protection and first aid procedures applicable to these hazards.

29CFR1910 Part 94(d)(9)(vi)

When, during emergencies as described in paragraph (d)(11)(v) of this section, workers must be in areas where concentrations of air contaminants are greater than the limit set by paragraph (d)(2)(iii) of this section, or oxygen concentrations are less than 19.5 percent, they shall be required to wear respirators adequate to reduce their exposure to a level below these limits, or to provide adequate oxygen. Such respirators shall also be provided in marked, quickly accessible storage compartments built for the purpose, when there exists the possibility of accidental release of hazardous concentrations of air contaminants. Respirators shall be approved by the U.S. Bureau of Mines, U.S. Department of the Interior and shall be selected by a competent industrial hygienist or other technically qualified source. Respirators shall be used in accordance with 1910.134, and persons who may require them shall be trained in their use.

29CFR1910 Part 120(e)(1)(i)

Training.
General. All employees working on site (such as but not limited to equipment operators, general laborers and others) exposed to hazardous substances, health hazards, or safety hazards and their supervisors and management responsible for the site shall receive training meeting the requirements of this paragraph before they are permitted to engage in hazardous waste operations that could expose them to hazardous substances, safety, or health hazards, and they shall receive review training as specified in this paragraph.

29CFR1910 Part 120(e)(2)

Elements to be covered. The training shall thoroughly cover the following:

(i) Names of personnel and alternates responsible for site safety and health;
(ii) Safety, health and other hazards present on the site;
(iii) use of personal protective equipment;
(iv) Work practices by which the employee can minimize risks from hazards;
(v) Safe use of engineering controls and equipment on the site;
(vi) Medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards; and
(vii) The contents of paragraphs (G) through (J) of the site safety and health plan set forth in paragraph (b)(4)(ii) of this section.

29CFR1910 Part 120(e)(3)(i)

Initial training. General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor.

29CFR1910 Part 120(e)(3)(ii)

Initial training.

4.0 TRAINING AND QUALIFICATION

Workers on site only occasionally for a specific limited task (such as, but not limited to, ground water monitoring, land surveying, or geo-physical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

29CFR1910 Part 120(e)(3)(iii)

Initial training. Workers regularly on site who work in areas which have been monitored and fully characterized indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing, shall receive a minimum of 24 hours of instruction off the site and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

29CFR1910 Part 120(e)(3)(iv)

Initial training Workers with 24 hours of training who are covered by paragraphs (e)(3)(ii) and (e)(3)(iii) of this section, and who become general site workers or who are required to wear respirators, shall have the additional 16 hours and two days of training necessary to total the training specified in paragraph (e)(3)(i).

29CFR1910 Part 120(e)(7)

Training.
Emergency response. Employees who are engaged in responding to hazardous emergency situations at hazardous waste clean-up sites that may expose them to hazardous substances shall be trained in how to respond to such expected emergencies.

29CFR1910 Part 120(q)(6)(i) and (ii)

Training.
Training shall be based on the duties and function to be performed by each responder of an emergency response organization. The skill and knowledge levels required for all new responders, those hired after the effective date of this standard, shall be conveyed to them through training before they are permitted to take part in actual emergency operations on an incident. Employees who participate, or are expected to participate, in emergency response, shall be given training in accordance with the following paragraphs:

(i) First responder awareness level. First responders at the awareness level are individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the authorities of the release. First responders at the awareness level shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:

(A) An understanding of what hazardous substances are, and the risks associated with them in an incident.
(B) An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.
(C) The ability to recognize the presence of hazardous substances in an emergency.
(D) The ability to identify the hazardous substances, if possible.
(E) An understanding of the role of the first responder awareness individual in the employer's emergency response plan including site security and control and the U.S. Department of Transportation's Emergency Response Guidebook.
(F) The ability to realize the need for additional resources, and to make appropriate notifications to the communication center.

(ii) First responder operations level. First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. First responders at the operational level shall have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed for the awareness level and the employer shall so certify:

(A) Knowledge of the basic hazard and risk assessment techniques.
(B) Know how to select and use proper personal protective equipment provided to the first responder operational level.
(C) An understanding of basic hazardous materials terms.

4.0 TRAINING AND QUALIFICATION

(D) Know how to perform basic control, containment and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.
(E) Know how to implement basic decontamination procedures.
(F) An understanding of the relevant standard operating procedures and termination procedures.

29CFR1910 Part 145(c)(1)(ii)

All employees shall be instructed that danger signs indicate immediate danger and that special precautions are necessary.

29CFR1910 Part 145(c)(2)(ii)

All employees shall be instructed that caution signs indicate a possible hazard against which proper precaution should be taken.

29CFR1910 Part 151(a) and (b)

(a) The employer shall ensure the ready availability of medical personnel for advice and consultation on matters of plant health.
(b) In the absence of an infirmary, clinic, or hospital in near proximity to the workplace which is used for the treatment of all injured employees, a person or persons shall be adequately trained to render first aid. First aid supplies approved by the consulting physician shall be readily available.

29CFR1910 Part 157(g)(1)

Training and Education. Where the employer has provided portable fire extinguishers for employee use in the workplace, the employer shall also provide an educational program to familiarize employees with the general principles of fire extinguisher use and the hazards involved with incipient stage fire fighting.

29CFR1910 Part 157(g)(2)

The employer shall provide the education required in paragraph (g)(1) of this section upon initial employment and at least annually thereafter.

29CFR1910 Part 157(g)(4)

The employer shall provide the training required in paragraph (g)(3) of this section upon initial assignment to the designated group of employees and at least annually thereafter.

DOE5480.20A Chapter I, Section 7.e(1)

e. 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.

(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

4.0 TRAINING AND QUALIFICATION

(i) Criticality safety.

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

DOE5480.20A 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.

DOE5480.20A 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.

DOE5480.9A Section 10.C(1) thru (3)

c. Training. The construction contractor shall ensure that each employee entering the worksite has, through experience, training and, where required, certification, the skills and knowledge necessary to safely perform his or her assigned tasks. In addition, the contractor shall ensure that each employee receives initial worksite safety and health orientation and continued safety and health training addressing the hazards associated with the work and the measures necessary to control or eliminate the hazards.

(1) Worksite Safety and Health Orientation.
(a) Each employee shall receive an initial safety and health orientation prior to performing any work on the project worksite. The construction manager shall ensure that proper local coordination has been performed for issues that may impact the facility host, the RCM, or any other contractors. The orientation shall address, at a minimum, the following points:

(1) Employee rights and responsibilities.
(2) Construction contractor responsibilities.
(3) Use and maintenance of required personnel protective equipment.
(4) Disciplinary procedures.
(5) Alcohol and drug abuse policy.
(6) First aid and medical facilities.
(7) General project hazards and the applicable policies and procedures for addressing these hazards.
(8) Hazard recognition and procedures for reporting or correcting unsafe conditions or practices.
(9) Procedures for reporting accidents and incidents.
(10) Fire prevention and control.
(11) Emergency response procedures to include local warning and evacuation systems.
(12) Hazard communication program (refer to 29 CFR1926.59).
(13) Access to employee exposure monitoring data and medical records.
(14) Location of and access to approved project safety and health plan.
(15) Host OSH programs or procedures applicable to the project (e.g., confined space, lock out/tag out).

(b) Contractors with a continual onsite presence or with multiple projects utilizing the same work force may provide a general orientation on the items above prior to commencing work on the employee's first onsite project and at least annually thereafter. Orientation on items that vary from project to project shall be provided for each project.

(2) Prephase Training. Prior to commencing any phase of work, the construction contractor shall review the approved AHA for that phase with all employees on the affected work crew and provide training to ensure that all employees understand the potential hazards and the required protective measures. A copy of each phase's AHA shall be annotated with the name, signature, and date of attendance of all workers who have

4.0 TRAINING AND QUALIFICATION

attended the pre-phase training. The construction contractor shall provide advance notice to the construction manager for all prephase training sessions. Further prephase training sessions shall be conducted for new employees on the work crew, under changing site conditions, or at the discretion of the construction manager to reinforce project safety and health requirements.

(3) "Tool Box" Safety and Health Training. The construction contractor shall conduct informal "tool box" safety and health training sessions at least weekly for all employees on the worksite. Depending on the size and nature of the project, this may be accomplished in single or multiple sessions and may address different topics for different work crews. Outlines of all "tool box" training sessions shall be prepared by the construction contractor and annotated with the date,time, and names of all employees in attendance.

RCRA-B(DW)(940829) Part II.C.1

The Permittees shall conduct personnel training as required by WAC 173-303-330. The Permittees shall maintain documents in accordance with WAC 173-303-330(2) and

(3). Training records may be maintained in the Hanford Facility operating record or on electronic data storage.

RCRA-B(DW)(940829) Part II.C.2

All Hanford Facility personnel shall receive general Facility training within six months of hire. This training shall provide personnel with orientation of dangerous waste management activities being conducted on the Hanford Facility. This training shall include:

a. Description of emergency signals and appropriate personnel response,
b. Identification of contacts for information regarding dangerous waste management activities,
c. Introduction to waste minimization concepts,
d. Identification of contact(s) for emergencies involving dangerous waste, and
e. Familiarization with the Hanford Facility Contingency Plan.

RCRA-B(DW)(940829) Part II.C.4

The Permittees shall provide the necessary training to non-Facility personnel (i.e., visitors, sub-contractors) as appropriate for the locations such personnel will be at and the activities that will be undertaken. At a minimum, this training shall describe dangerous waste management hazards at the Facility.

4.3.1.2 Radiation Protection Training

29CFR1910 Part 134(b)(3)

The user shall be instructed and trained in the proper use of respirators and their limitations.

DOE/EH0256T(940431) Chapter 1, Part 2, Article 121.10

The authority and responsibility to establish a comprehensive and effective radiological control training program should be assigned to line managers and their subordinates. Training, in most cases, should be provided by a dedicated training organization, but the responsibility for quality and effectiveness rests with line management.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 612 Introduction

Standardization
Standardized core courses and training materials shall be used to achieve consistency Department-wide. In establishing local training programs, the standardized core courses shall be presented and site-specific information shall be added. For example, training at accelerator facilities should expand course content for high energy radiation and activation products. Training at plutonium facilities should expand the course content for alpha control. In all cases, the standardized core course materials, as listed in the References section, shall be fully implemented.

Standardized core course training material developed and maintained by DOE Headquarters (EH) consists of lesson plans, designated viewgraphs, student handbooks, qualification standards, question banks and wallet-sized training certificates. The standardized core course training materials were based on ASTM E 1168 87, "Standard Guide for Radiological Protection Training for Nuclear Facility Workers," and

4.0 TRAINING AND QUALIFICATION

were developed using the principles of performance-based training per DOE 5480.20. The standardized core course for the Radiological Control Technicians partially fulfills DOE training accreditation requirements of DOE 5480.18A.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 612.1

Standardized core course training material shall be used for General Employee Radiological Training, Radiological Worker I and II training and Radiological Control Technician training.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 612.2

Wallet-sized training certificates that identify current training status should be provided.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 612.3

Successful completion of the standardized courses for General Employee Radiological Training, Radiological Worker I and II and Radiological Control Technician at one DOE site within the past two years shall be recognized by other DOE sites. Documentation of previous training shall include the individual's name, date of training, topics covered, and name of the certifying official. However, site-specific aspects of the radiological training shall be completed. Site-specific training for General Employee Radiological Training and Radiological Worker I and II training may be included with other site orientation training.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 612.4

At sites where there are multiple facilities, the training may be facility-specific if personnel access is limited to those facilities for which training has been completed.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 612.5

The site Radiological Control Manager or a designee shall concur in site-generated radiological training material.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 613. 1

Requirements
Examinations for General Employee Radiological training, Radiological Worker I and II training and Radiological Control Technician qualification shall be used to demonstrate satisfactory completion of theoretical and classroom material. Examinations should be written; however, the Radiological Control Manager may approve alternatives to accommodate special needs. Alternative examination process should require:

a. That a minimum passing score be established;
b. That true/false questions not be included;
c. Use of questions randomly selected from the question bank;
d. Acknowledgement by signature that the student participated in a post-examination review;
e. That competence in required skills be measured using performance-based examinations;
f. Remedial actions for failure to meet the minimum score;
g. That the question bank contain questions that test what the student is expected to remember months after the training rather than to test short-term memory of theoretical material.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 613. 2

Training should address both normal and abnormal situations in radiological control.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 613. 3

General Employee Radiological Training shall be completed every 2 years. Changes to the program shall be incorporated as they are identified and a decision made if retraining prior to the 2 year period is needed. In the alternate year when full retraining is not completed, the latest General Employee Radiological Training Handbook (Student Guide) should be distributed for self-study.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 613. 4

Radiological Worker I and II retraining shall be completed every 2 years. In the alternate year when retraining is not performed, refresher training shall be completed.

4.0 TRAINING AND QUALIFICATION

DOE/EH0256T(940431) Chapter 6, Part 1, Article 613. 5

Site-specific training and refresher training shall include changes in requirements and updates of lessons learned from operations and maintenance experience and occurrence reporting, for the site and across the DOE complex.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 613. 8

Training programs developed for radiological control should meet the requirements for performance-based training and, when applicable, training accreditation.

DOE/EH0256T(940431) Chapter 6, Part 1, Article 613. 9

Reading and comprehension skills in the English language are generally necessary for General Employee Radiological Training. The Radiological Control Manager is authorized to approve alternative temporary training methods for those lacking reading and comprehension skills in the English language until adequate English language skills can be achieved. Training in an alternate language should be equivalent to training in English. Visitor orientation and the use of trained escorts provide an alternate to training with the concurrence of the Radiological Control Manager.

DOE/EH0256T(940431) Chapter 6, Part 2, Article 621 Introduction

General Employee Radiological Training
Site Personnel
Personnel who may routinely enter the Controlled Area and encounter radiological barriers, postings or radioactive materials shall receive General Employee Radiological Training. This training shall be successfully completed prior to potential occupational radiation exposure. General Employee Radiological Training is recommended for all employees.

DOE/EH0256T(940431) Chapter 6, Part 2, Article 621.1

General Employee Radiological Training shall include the standardized core course training materials.

DOE/EH0256T(940431) Chapter 6, Part 2, Article 621.2

Standardized core General Employee Radiological Training shall be expanded to include site-specific information, such as site-specific radiation types, alarm responses and policies.

DOE/EH0256T(940431) Chapter 6, Part 2, Article 621.3

Workers may challenge General Employee Radiological Training standardized core knowledge requirements by passing a comprehensive examination. If unsuccessful in one attempt, the entire General Employee Radiological Training standardized core training shall be completed. Challenges do not apply to the site-specific portions.

DOE/EH0256T(940431) Chapter 6, Part 2, Article 621.5, Paragraph 2

Information may be communicated by classroom lecture, videotape, or other applicable methods.

DOE/EH0256T(940431) Chapter 6, Part 2, Article 622.1

Visitors who enter the Controlled Area shall receive a radiological safety orientation that should include the following topics:

a. Basic radiation protection concepts;
b. Risk of low-level occupational radiation exposure, including cancer and genetic effects;
c. Risk of prenatal radiation exposure;
d. Radiological protection policies and procedures;
e. Visitor and management responsibilities for radiation safety;
f. Adherence to radiological posting and labeling;
g. Applicable emergency procedures;
h. Training for issuance of dosimeters, where applicable.

DOE/EH0256T(940431) Chapter 6, Part 2, Article 622.3

Records of the orientation shall be maintained. Visitor sign-in logs may be used as orientation records.

4.0 TRAINING AND QUALIFICATION

DOE/EH0256T(940431) Chapter 6, Part 2, Article 622.4

The orientation for continuously escorted individuals or groups should be commensurate with the areas to be visited. Records of orientation for such individuals or groups should be retained.

DOE/EH0256T(940431) Chapter 6, Part 5, Article 657.1

Sites should establish radiological control training for tour groups and visiting dignitaries, scientists and specialists commensurate with the areas they are to enter. This training is intended for individuals not performing hands-on work.

DOE5480.11 Section 9.o(1)

All employees. All occupational workers who may enter a controlled area at a DOE facility shall review an orientation in radiation safety within 1 month of their initial assignment to and prior to potential exposure to radiation at that facility. Retraining shall be provided when there are significant changes to radiation protection policies and procedures which affect general plant employees and should be provided every 2 years. Generic training (not specific to a facility) in all or some of the topics listed below may be waived provided: this training has been received at another DOE facility; there is provision of proof-of-training in the form of a certification document containing the individual's name, date of training, and specific topics covered; and an appropriate official has certified the training of the individual. The level of training is to be commensurate with the employee's job assignment with the initial orientation including, but not limited to:

(a) The risk of low-level occupational radiation exposure, including cancer and genetic effects;

(b) The risk of prenatal radiation exposure;

(c) Basic radiation protection concepts;

(d) DOE and company radiation protection policies and procedures;

(e) Employee and management responsibilities for radiation safety;

(f) Emergency procedures.

DOE5480.11 Section 9.o(2), Paragraph 2

Additionally, the level of training in the following topics is to be commensurate with each worker's assignment:

(a) Radioactivity and radioactive decay;
(b) Characteristics of ionizing radiation;
(c) Man-made radiation sources;
(d) Acute effects of exposure to radiation;
(e) Risks associated with occupational radiation exposures;
(f) Special considerations in the exposure of women of reproductive age;
(g) Dose-equivalent limits;
(h) Mode of exposure -- internal and external;
(i) Dose-equivalent determinations;
(j) Basic protective measures – time, distance, shielding;
(k) Specific plant procedures for maintaining exposure as low as is reasonably achievable;
(l) Radiation survey instrumentation -- calibration and limitations;
(m) Radiation monitoring programs and procedures;
(n) Contamination control, including protective clothing and equipment and workplace design;
(o) Personnel decontamination;
(p) Emergency procedures;
(q) Warning signs and alarms;
(r) Responsibilities of employees and management;
(s) Interaction with radiation protection staff;

4.0 TRAINING AND QUALIFICATION

(t) Operational procedures associated with specific job assignments (e.g., radiation generating machines, glove boxes).

4.3.1.3 Maintenance Training Program

DOE4330.4B Chapter II, Section 3.2, Paragraph 1

The training organization should maintain maintenance training programs that meet the intent of established industrial guidelines and that address specific company and facility needs. These training programs are supported and guided by the maintenance organization. This support and guidance normally includes all or a portion of the following tasks:

- o Defining the jobs, tasks, skill levels, and responsibilities of individuals in these positions;
- o Defining training programs for each position;
- o Determining the content and emphasis of the training needed;
- o Determining and supporting training schedules;
- o Determining the training needs of and tailoring the training program for each individual based on previous education, training, experience, and skill level;
- o Providing instructors and trainers;
- o Establishing qualification criteria, with emphasis on successful performance in the field;
- o Coordinating the conduct of and instruction during OJT;
- o Qualifying individuals as they complete their training programs; and
- o Providing training-effectiveness feedback to the training organization to enhance and, where necessary, adjust course teaching methods, content, and emphasis.

DOE4330.4B Chapter II, Section 3.2, Paragraph 2, Sentence 3

The maintenance training program should be used as the basis for determining the space and equipment needed for training facilities.

DOE5480.20A Chapter I, Section 7.g

Technician and Maintenance Personnel Training Requirements. Technicians are principally involved in calibration, inspection, troubleshooting, testing, maintenance, and radiation protection activities at the facility. Examples include laboratory technicians, instrument technicians, and radiological control technicians. Maintenance personnel perform maintenance and repair on mechanical and electrical equipment.

(1) All technicians and maintenance personnel shall be qualified to perform the tasks associated with their specialty, or work under the direct supervision of personnel qualified to perform the activity or task.

(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.

(3) Training program content for radiological control technicians (RCT) shall be in accordance with the requirements contained in 10 CFR 835, Occupational Radiation Protection, and DOE/EH-0256T, DOE Radiological Control Manual. RCT training program elements (i.e., selection, training process, continuing training, qualification) shall be in accordance with the requirements of this Order.

4.0 TRAINING AND QUALIFICATION

DOE5480.20A 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

4.3.1.4 Management and Supervisory Training

29CFR1910 Part 120(e)(4)

Management and supervisor training. On-site management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations shall receive 40 hours initial training, and three days of supervised field experience (the training may be reduced to 24 hours and one day if the only area of their responsibility is employees covered by paragraphs (e)(3)(ii) and (e)(3)(iii) and at least eight additional hours of specialized training at the time of job assignments on such topics as, but not limited to, the employer's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques.

DOE/EH0256T(940431) Chapter 1, Part 2, Article 124 Introduction

Radiation and Risk Communications
Due to the continuing concerns of many people related to low radiation exposure and health impacts, managers should be trained to deal with the perception of personnel concerning radiation risks. Managers and first-line supervisors should be sensitive to the fact that workers have to understand the fundamentals of radiation, its risks and their role in minimizing exposure. It is not sufficient to rely solely on regulatory limits for establishing or defining acceptable work practices and work environments.

DOE/EH0256T(940431) Chapter 1, Part 2, Article 124.1

Appropriate personnel should receive training which is helpful in their dealing with workers who have anxiety about radiation. This training should include the following:
a. Guidance on handling such personnel interactions
b. Emphasis on being factual
c. Fundamentals of communicating risks
d. Importance of keeping management informed.

DOE/EH0256T(940431) Chapter 6, Part 5, Article 651

Other Radiological Training
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.

DOE5480.19 Attachment I, Chapter I, Section C.5

Management Training
Formalized supervisory and management training should be incorporated into training programs. This is especially important to the first-line supervisors on shift and should aid them in managing shift activities.

DOE5480.20A Chapter I, Section 7.i

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

4.0 TRAINING AND QUALIFICATION

(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.

(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.

DOE5480.20A Chapter IV, Section 2.b

Supervisors. This functional level consists of those individuals who are responsible for the quantity and quality of work 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.

DOE5480.20A 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

4.0 TRAINING AND QUALIFICATION

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.

4.3.1.5 Operator Training

DOE5480.20A Chapter I, Section 7.f

Probabilistic Risk Assessment (PRA) Training Requirements. At those nuclear facilities for which a PRA has been performed, initial and continuing training programs for operations and technical staff personnel shall include training on the principal results of the PRA. This training shall address the following:

(1) The importance of facility systems in preventing damage or severe accidents;

(2) Locations of all significant amounts of radioactive and other hazardous materials, and measures to prevent its release; and

(3) The importance of maintaining operational limits and conditions, and the consequences of violating those limits.

DOE5480.20A 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

DOE5480.20A Chapter IV, Section 4, Introduction

Specific Training Requirements.
The depth and scope of training and qualification programs for operating organization personnel at non-reactor nuclear facilities shall be commensurate with the hazard level and complexity of the operations (i.e., a graded approach should be used to develop and implement the training programs). This section provides specific training requirements for operators, fissionable material handlers, and supervisors.

DOE5480.20A Chapter IV, Section 4.a(1)

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

DOE5480.20A Chapter IV, Section 4.a(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;

4.0 TRAINING AND QUALIFICATION

(e) Procedures for making changes or alterations in operations and operating procedures; and

(f) Technical Safety Requirements.

4.3.1.6 Fissionable Material Handler Training

DOE5480.20A Chapter II, Section 6.b

Fuel Handling Operations. All fuel handling operations shall be performed by or under the direct supervision of a person certified to perform the required functions. The requirements below are not necessary if fuel handling is performed by persons qualified for such as part of reactor operator and senior reactor operator certification programs:

(1) A specific training program shall be established to certify fuel handling operators and supervisors. The program shall include training for their assigned tasks; and

(2) The program for fuel handling operators and supervisors shall consist of initial and continuing training. Training and examination may be limited to that needed for fuel handling safety, the impact of fuel handling on safety, and actions to be taken during abnormal and emergency conditions.

DOE5480.20A Chapter IV, Section 4.b

Fissionable Material Handlers.
Fissionable material handler candidates shall be trained in the following subject areas in addition to that required in paragraph 4a above to the extent applicable to the position:

(1) Instrumentation and control, including types of instruments and control systems, principles of operation, and consequences of malfunctions;

(2) Facility operating characteristics, including principal features, operating parameters, and operating limits of the facility (to include auxiliary systems); and

(3) Principles of nuclear facility operation, including the processes involved and technical terminology for the chemical, physical, and metallurgical reactions and criticality safety principles, controls, and specifications.

4.3.1.7 Continuing Training

29CFR1910 Part 119(g)(2)

Refresher training. Refresher training shall be provided at least every three years, and more often if necessary, to each employee involved in operating a process to assure that the employee understands and adheres to the current operating procedures of the process. The employer, in consultation with the employees involved in operating the process, shall determine the appropriate frequency of refresher training.

29CFR1910 Part 120(e)(8)

Refresher training. Employees specified in paragraph (e)(1) of this section, and managers and supervisors specified in paragraph (e)(4) of this section, shall receive eight hours of refresher training annually on the items specified in paragraph (e)(2) and/or (e)(4) of this section, any critique of incidents that have occurred in the past year that can serve as training examples of related work, and other relevant topics.

29CFR1910 Part 120(q)(8)

Refresher training.

(i) Those employees who are trained in accordance with paragraph (q)(6) of this section shall receive annual refresher training of sufficient content and duration to maintain their competencies, or shall demonstrate competency in those areas at least yearly.

(ii) A statement shall be made of the training or competency, and if a statement of competency is made, the employer shall keep a record of the

4.0 TRAINING AND QUALIFICATION

methodology used to demonstrate competency.

DOE1324.5A Section 8.b(4)

Ensure that plans are developed and implemented for conducting continuous records management awareness and training to assure that DOE and DOE contractor personnel involved in managing, designing, developing, using, and maintaining records systems are aware of their responsibilities, know how to fulfill them, are kept aware of new requirements, and are trained in techniques to implement them.

DOE5480.20A Chapter I, Section 7.d(1)

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.

(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.

DOE5480.20A Chapter I, Section 7.d(2)

(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.

DOE5480.20A Chapter I, Section 7.d(3)

(3) Continuing training programs for certified operations personnel shall consist of preplanned classroom-type training, on-the-job training, and operational evaluations on a regular and continuing basis. Continuing training programs for certified operators and certified supervisors shall include, at a minimum, the following as related to job performance:

(a) Training and examination covering abnormal facility procedures and emergencies shall be required at least annually for certified operators and certified supervisors;

(b) Drills conducted in the facility or on a simulator to enable personnel and operating teams to maintain their ability to respond to abnormal or accident situations. Training drills conducted in the facility shall not lead to or have the potential for safety concerns;

(c) Instruction in the use of facility systems to control or mitigate accidents. Such training shall include both classroom-type training and training conducted in the facility; and

(d) Training, as applicable to the position, in the following subjects where examinations and experience (industry and facility-specific) or other evidence indicates additional emphasis in scope and depth of coverage is needed:

1 Theory and principles of facility operation;

2 General and specific facility operating characteristics;

3 Facility instrumentation and control;

4 Facility protection systems;

4.0 TRAINING AND QUALIFICATION

5 Engineered Safety Features;

6 Normal, abnormal, and emergency procedures;

7 Radiation control and safety; and

8 Technical Safety Requirements.

DOE5480.20A Chapter I, Section 7.d(4)

Personnel who are responsible for developing and delivering training may be excused from continuing training for the area of primary administrative responsibility. For example, an individual who prepares, administers, and grades a written examination need not take the examination.

DOE5480.20A 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.

4.3.1.8 Technical Support Personnel Training

29CFR1910 Part 120(q)(5)

Specialist employees.
Employees who, in the course of their regular job duties, work with and are trained in the hazards of specific hazardous substances, and who will be called upon to provide technical advice or assistance at a hazardous substance release incident to the individual in charge, shall receive training or demonstrate competency in the area of their specialization annually.

DOE/EH0256T(940431) Chapter 6, Part 5, Article 652

Technical Support Personnel
Appropriate technical support personnel (engineers, schedulers, procedure writers) should be trained in the principles of ALARA, basic ALARA techniques and dose reduction techniques. They should also participate in selected portions of job-specific and specialized training, particularly in situations using mock-ups.

DOE/EH0256T(940431) Chapter 6, Part 5, Article 653

Planners
Planners who develop detailed work plans involving or associated with radioactivity or radioactive materials should have Radiological Worker training to the level required by the workers using the work plans. It is desirable that planners have Radiological Worker II training.

DOE5480.20A Chapter I, Section 7.h

Technical Staff Training Requirements. Technical staff personnel are typically involved in surveillance, testing, analyzing facility data, planning modifications, program review, and technical problem resolution in their area of expertise (e.g., electrical, mechanical, instrumentation and control, chemistry, radiation protection, safety, quality assurance, facility engineering).

(1) The contractor shall develop a list of specific technical staff positions that have a direct impact on employee, facility, or public safety.

(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

4.0 TRAINING AND QUALIFICATION

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.

DOE5480.20A 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

DOE5480.21 Chapter III, Section 8

All personnel responsible for performing, reviewing, or approving USQ
determinations should receive initial training on the application of the Order and of facility-specific procedures. Retraining is recommended on an interval of every 2 years or as may be proposed by the contractor.

DOE5480.7A Section 9.c.(6)

Training. Training shall be provided for the individuals within the fire protection organization, the fire department/brigade, and any other person with responsibilities for fire safety. Training programs shall reflect the criteria contained in the mandatory codes and standards listed in paragraph 5 and shall reflect site-specific considerations.

4.0 TRAINING AND QUALIFICATION

4.3.1.9 Hoisting and Rigging Training

DOE/RL92-36 Part 12.2

OPERATOR QUALIFICATIONS

Equipment within the scope of this section shall be operated only by the following qualified personnel:

1. Qualified operators (see Section 4.0)
2. Trainees under the direct supervision of a designated person
3. Maintenance, inspection, and test personnel, when it is necessary in the performance of their duties.

DOE/RL92-36 Part 4.3.1

Qualified Personnel

Qualified personnel shall meet all physical requirements and be trained and evaluated on the equipment, operating characteristics, capabilities, limitations, effects of variables, safety features, and required operating procedures. Training shall include those contents of this manual that pertain to the type of equipment and level of skill required to perform work.

DOE/RL92-36 Part 4.4

QUALIFICATION RECORDS

Qualification records shall meet the following requirements:

1. Be documented and maintained verifiable by the authorized issuing organization for the duration of qualification.
2. Contain documented written and performance evaluation of knowledge and skills with name and signature of authorized evaluator.
3. Indicate the equipment type or component and expiration date of qualification.

Qualified personnel shall be issued a document for field verification indicating, but not limited to, type of equipment or component, expiration date, name of qualified individual, and signature of authorized issuer.

DOE/RL92-36 Part 4.5

REQUALIFICATION

Personnel shall be eligible for requalification only after successfully completing initial qualification requirements. Requalification shall be within 3 years of previous qualification to ensure personnel are updated on changes in regulations, equipment, and procedures.

Requalification shall include on the following:

1. Successful completion of a written and/or performance challenge evaluation.
2. Completion of training and evaluation.

4.3.2 Training Subject Identification

29CFR1910 Part 120(e)(1)(ii)

Employees shall not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility.

DOE/EH0135 TC.1.1

For each work classification, training and qualification/certification requirements based on assigned job tasks are established.

DOE/EH0135 TC.1.11

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

DOE/EH0135 TC.5.2

On-the-job training requirements are identified, completed, and documented prior to assignment to perform the tasks independently.

DOE5480.20A Chapter I, Section 7.h

Technical Staff Training Requirements. Technical staff personnel are typically involved in surveillance, testing, analyzing facility data, planning modifications, program review, and technical problem resolution in their area of expertise (e.g., electrical, mechanical, instrumentation and control, chemistry, radiation protection, safety, quality assurance, facility engineering).

4.0 TRAINING AND QUALIFICATION

(1) The contractor shall develop a list of specific technical staff positions that have a direct impact on employee, facility, or public safety.

(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

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.

4.4 Training Records and Documentation

29CFR1910 Part 119(g)(3)

Training documentation. The employer shall ascertain that each employee involved in operating a process has received and understood the training required by this paragraph. The employer shall prepare a record which contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.

DOE/EH0256T(940431) Chapter 7, Part 2, Article 725.1

Radiological Training and Qualification Records
Records of training and qualification in radiological control shall be maintained to demonstrate that a person received appropriate information to perform the work assignment in a safe manner. Qualification standard records shall be retained for on-the-job and practical factor training as well

4.0 TRAINING AND QUALIFICATION

as for formal classroom training.

DOE/EH0256T(940431) Chapter 7, Part 2, Article 725.2

Formal records of training and qualification shall be readily available to first-line supervision and management of involved personnel to aid in making work assignments.

DOE/EH0256T(940431) Chapter 7, Part 2, Article 725.3

Personnel training records shall be controlled and retained. At a minimum, these records shall include the following:

a. Course title;
b. Attendance sheets with instructor's name;
c. Employee's name, identification number and signature;
d. Date of training;
e. Identification of the examination or evaluation form, including sufficient data to identify which test each person completed;
f. Verification document or record confirming satisfaction of the training requirement;
g. Documentation related to exceptions for training requirements and extensions of qualification;
h. Quizzes, tests, responses and acknowledgements of training, with the date and signature of the person trained;
i. Special instructions to females, their supervisors and coworkers concerning prenatal radiation dose, acknowledged by the worker's signature.

DOE/EH0256T(940431) Chapter 7, Part 2, Article 725.4

Records shall be retained for the following types of training:

a. General employee radiological training;
b. Radiological Worker training;
c. Periodic retraining;
d. Respiratory protection training;
e. Training of radiological control personnel;
f. Instructor training;
g. Qualifications for special tests or operations;
h. Orientation and training of visitors;
i. Training of emergency response personnel.

DOE/EH0256T(940431) 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;
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.

DOE/EH0256T(940431) Chapter 7, Part 2, Article 725.6

Documentation of training and qualification received at another DOE location need not be duplicated. Such records should be provided to the person's home office for retention.

DOE/EH0256T(940431) Chapter 7, Part 3, Article 731.1

Visitors
Record Requirements
Documentation of completion of Radiological Orientation shall be maintained for visitors entering an area where radiation monitoring is required.

4.0 TRAINING AND QUALIFICATION

DOE5480.11 Section 9.m

Records. As a minimum, the records specified below of the radiation protection program and dosimetry records for all individuals for whom monitoring is provided shall be generated and maintained, commencing with the effective data of this Order. Information and data developed pursuant to this Order shall be retained consistent with the requirements of DOE 1324.2A, RECORDS DISPOSITION.

DOE5480.11 Section 9.m(5)

Training Records. Training Records of plant employees, radiation workers, and radiation safety personnel shall be retained to document the level of understanding and proficiency of personnel who work with radioactive materials. Certification of successful completion of training programs and performance records should also be retained.

DOE5480.19 Attachment I, Chapter V, Section C.5

Training Documentation
Completion of the operator qualification program should be formally documented. Classroom requirements and written exam results should be documented by training department instructors. On-shift training and system checkouts should be documented by on-shift instructors.

DOE5480.20A Chapter I, Section 15

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.

a. Qualification and certification of personnel shall be documented in an easily auditable format. Individual record documentation shall include:

(1) Education, experience, and employment history and most recent health evaluation summary. (e.g., 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 the knowledge and performance during operational evaluations;

(4) Lists of questions asked and the examiner's overall evaluations 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.

b. 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.

WAC-173-303 Section 330(3)

Training records. Training records on current personnel must be kept until closure of the facility. Training records on former employees must be kept for at least three years from the date the employees last worked at the facility. Personnel training records may accompany personnel transferred within the same company.

4.0 TRAINING AND QUALIFICATION

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5.0 EMERGENCY MANAGEMENT

5.0 EMERGENCY MANAGEMENT

5.1.2 Duties, Responsibilities, and Authorities for Program Management

DOE/RL94-02 Rev. 0 Chapter 2, Section 2.1.1.1

2.1.1.1 Event Contractor. The contractor that maintains responsibility for the facility or activity with the emergency is designated as the Event Contractor. The Event Contractor responsibilities include:

* Prompt and accurate categorizing of all occurrences in accordance with DOE Order 5000.3B (DOE 1993).
* Initially classifying the emergency
* Mitigating the emergency situation
* Initiating actions to protect workers within their geographic area of responsibility
* Notifying the Occurrence Notification Center (ONC) to make onsite and initial offsite notifications
* Requesting support from nonevent contractors, as necessary
* Establishing an Event Command Post (ECP)
* Providing emergency management team members to the Area Emergency Control Centers (ECCs)
* Providing a senior management representative to the Emergency Management Center (EMC)
* Providing event status information to the Area ECCs
* Providing the manager and technical spokesperson for the JIC
* Providing a senior management representative to the RL-ECC to provide liaison between the event scene and RL.

Other contractors shall provide support to the Event Contractor for actions related to the services they provide on Site, such as notifications,fire, medical, or security services.

DOE/RL94-02 Rev. 0 Chapter 13, Section 13.1, Paragragh 2, Sentence 2

Each facility shall designate BEDs or BWs who are responsible for the facility emergency program.

5.1.3 Duties, Responsibilities and Authorities for ERO

DOE/RL94-02 Rev. 0 Chapter 2, Section 2.2.1.2

2.2.1.2 Hazardous Facilities. The building emergency organization in hazardous facilities is responsible for emergency response at the event scene. The building organization shall assign a BED who shall direct an emergency organization made up of individuals within the building who will assist in the protection of personnel, property, and the environment. The positions and responsibilities shall be detailed in specific building emergency plans. The content, distribution and organizational approval of the building emergency plan shall be determined by the contractor emergency preparedness organization. The responsibilities of the BED shall include:

* Assignment and training of the building emergency organization
* Reviewing and revising the building emergency plan at least every 15 months
* Determining the appropriate emergency event classification and providing emergency classification information to the ONC in accordance with established procedures
* Directing the ONC to initiate center activations, notifications, and predetermined offsite PARs in accordance with established procedures
* Implement predetermined onsite protective actions
* Establishing an ECP
* Mitigating emergencies within the assigned building.

DOE/RL94-02 Rev. 1 Chapter 2, Section 2.0, Introduction, Sentences 2&3

The emergency response organization shall be structured and staffed with adequate, trained personnel, including designated alternates, to enable the most timely and effective response possible, while meeting the requirements as set forth in the DOE 5500 series Orders and other applicable state and Federal regulations. Emergency response responsibilities and tasks shall be assigned to individuals identified by name, title, or position.

DOE5000.3B Section 8.a.(2)

(2) Appropriate immediate response(s) shall be taken by contractor operations personnel to stabilize or return the facility/operation to a safe condition.

5.0 EMERGENCY MANAGEMENT

WAC-173-303 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.

5.2.1 General Employee Training

DOE/RL94-02 Rev. 0 Chapter 11, Section 11.1 , Paragraph 3

Training shall be provided annually to workers who may have to take protective actions in the event of an emergency. This may be provided through general employee training and/or participation in drills/exercises.

5.2.2 Emergency Response Organization (ERO) Training

29CFR1910 Part 38(a)(5)

Employee emergency plans and fire preventions. Emergency action plan. Training.

(i) Before implementing the emergency action plan, the employer shall designate and train a sufficient number of persons to assist in the safe and orderly emergency evacuation of employees.

(ii) The employer shall review the plan with each employee covered by the plan at the following times:

(A) Initially when the plan is developed,
(B) Whenever the employee's responsibilities or designated actions under the plan change, and
(C) Whenever the plan is changed.

(iii) The employer shall review with each employee upon initial assignment those parts of the plan which the employee must know to protect the employee in the event of an emergency. The written plan shall be kept at the workplace and made available for employee review. For those employers with 10 or fewer employees the plan may be communicated orally to employees and the employer need not maintain a written plan.

DOE/RL94-02 Rev. 1 Chapter 11, Section 11.1, Paragraph 1, Sentence 1

The emergency preparedness training program shall include a mix of classroom instruction, tabletop exercises or walk-throughs, and drills.

DOE/RL94-02 Rev. 1 Chapter 11, Section 11.1, Paragraph 1, Sentence 2

A formal training program shall be in place for the instruction and qualification of all personnel (primary and alternate) who comprise the Hanford Site emergency response organization to include initial training and annual retraining for both onsite incidents and offsite incidents that impact the site, including transportation incidents.

DOE/RL94-02 Rev. 1 Chapter 11, Section 11.1, Paragraph 1, Sentence 3

Training programs shall be systematic and performance based (i.e., based on an analysis of tasks to be performed during an emergency) and developed using performance objectives that place emphasis on team training and facility-specific emergency response scenarios.

DOE/RL94-02 Rev. 1 Chapter 11, Section 11.1, Paragraph 2

Annual retraining for all emergency response organizations shall include lessons learned from past drills and exercises, changes to plans and procedures, and lessons learned from emergencies at DOE and other industrial facilities.

5.0 EMERGENCY MANAGEMENT

5.3.1 Hazards Assessment

DOE/RL94-02 Rev. 0 Chapter 4, Section 4.1

4.1 HAZARDS ASSESSMENT

Hazards assessments shall be prepared and maintained for each hazardous facility (i.e., facilities that could generate an Alertlevel or higher emergency).

The Hanford Site hazardous facilities assessments shall identify and characterize the hazards relevant to potential operational emergencies at a facility. This shall include determination of:

* The broad range of initiating events
* Accident mechanisms
* Equipment or system failures
* Event indications
* Contributing events
* Source terms
* Material release characteristics
* Topography
* Environmental transport and diffusion
* Exposure considerations.

The hazards assessment shall characterize the potential onsite and offsite consequences of each postulated accident and determine the size of the EPZ.

The methodology, assumptions, models, and evaluation techniques used in the hazards assessment shall be documented. They shall be reviewed and updated, as necessary, whenever the facility configuration changes, source terms change, or the operations of the facility are modified. These documents shall be maintained as a supporting document in accordance with contractor document control requirements.

WAC-173-303 Section 355(2)

Appropriate and generally accepted computer models should be utilized to determine the impacts of a potential catastrophic air release due to fire, explosion, or other accidental releases of hazardous constituents. Evacuation plans prepared pursuant to WAC 173-303-350(3)(d) shall include those effected persons and areas identified through these modelling efforts.

5.3.2 Emergency Plan

29CFR1910 Part 38(a)(1)

Employee emergency plans and fire preventions. Emergency action plan -- Scope and application. This paragraph (a) applies to all emergency action plans required by a particular OSHA standard. The emergency action plan shall be in writing (except as provided in the last sentence of paragraph (a)(5)(iii) of this section) and shall cover those designated actions employers and employees must take to ensure employee safety from fire and other emergencies.

29CFR1910 Part 38(a)(2)

Elements. The following elements, at a minimum, shall be included in the plan:

(i) Emergency escape procedures and emergency escape route assignments;
(ii) Procedures to be followed by employees who remain to operate critical plant operations before they evacuate;
(iii) Procedures to account for all employees after emergency evacuation has been completed;
(iv) Rescue and medical duties for those employees who are to perform them;
(v) The preferred means of reporting fires and other emergencies; and
(vi) Names or regular job titles of persons or departments who can be contacted for further information or explanation of duties under the plan.

5.0 EMERGENCY MANAGEMENT

29CFR1910 Part 38(a)(4)

Employee emergency plans and fire preventions. Emergency action plan. Evacuation. The employer shall establish in the emergency action plan the types of evacuation to be used in emergency circumstances.

WAC-173-303 Section 350 General

350 (1) Purpose. The purpose of this section and WAC 173-303-360 is to lessen the potential impact on the public health and the environment in the event of an emergency circumstance, including a fire, explosion, or unplanned sudden or nonsudden release of dangerous waste or dangerous waste constituents to air, soil, surface water, or ground water by a facility. A contingency plan must be developed to lessen the potential impacts of such emergency circumstances, and the plan shall be implemented immediately in such emergency circumstances.

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.

350 (3) The contingency plan must contain the following:

350 (3) (a) A description of the actions which facility personnel must take to comply with this section and WAC 173-303-360;

350 (3) (b) A description of the actions which shall 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;

350 (3) (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;

350 (3) (d) A current list of names, addresses, and phone number (office and home) of all persons qualified to act as the emergency coordinator required under WAC 173-303-360(l). 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;

350 (3) (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

350 (3) (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.

350 (4) Copies of contingency plan. A copy of the contingency plan and all revisions to the plan shall be:

350 (4) (a) Maintained at the facility; and

350 (4) (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.

350 (5) Amendments. The owner or operator shall review and immediately amend the contingency plan, if necessary, whenever:

350 (5) (a) Applicable regulations or the facility permit are revised;

5.0 EMERGENCY MANAGEMENT

350 (5) (b) The plan fails in an emergency;

350 (5) (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;

350 (5) (d) The list of emergency coordinators changes; or

350 (5) (e) The list of emergency equipment changes.

5.3.3 Emergency Implementing Procedures

DOE/RL94-02 Rev. 0 Chapter 5, Section 5.2.3.1

Shutdown of Operations

Site contractor emergency procedures shall provide for immediate emergency response actions to be taken to prevent or reduce exposures to workers and the public, such as the shutdown of operations or other operating actions. If practical, the cognizant DOE-HQ Program Senior Official and the DOE-HQ EMT shall be notified prior to shutdown, or as time permits.

DOE/RL94-02 Rev. 1 Chapter 1, Section 1.2, Paragraph 2

The RL and each site contractor shall develop and maintain procedures or other documents necessary to implement the emergency management program described in the Hanford Emergency Response Plan. Procedures must be consistent and compatible with the emergency plan and shall contain detailed information and the specific instructions, including response actions, associated precautions and prerequisites, and identification of responsible individuals, needed to carry out the emergency plan during a drill, exercise, or actual emergency.

DOE5480.10 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).

WAC-173-303 Section 360(2)

Emergency procedures. The following procedures shall 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 extent of any released materials.

(c) Concurrently, the emergency coordinator shall assess possible hazards to human health and the environment (considering direct, indirect, immediate, and long-term effects) that may result from 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.

(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;

5.0 EMERGENCY MANAGEMENT

(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.

5.4.2 Emergency Equipment and Supplies

29CFR1910 Part 134(a)(7), Last Sentence

Respiratory protection. Permissible practice. Respirators for emergency use such as self-contained devices shall be thoroughly inspected at least once a month and after each use.

29CFR1910 Part 134(f)(2)(iv)

Maintenance and care of respirators. A record shall be kept of inspection dates and findings for respirators maintained for emergency use.

DOE/RL94-02 Rev. 0 Chapter 10 Section 10.2.1

10.2.1 Assessment Equipment

Emergency equipment shall be available, as appropriate, to allow an early and reliable determination of the seriousness of an accident. The equipment for both emergency and continuing assessment of the facilities and environment at the Hanford Site consists of dosimeters, criticality detectors and alarms, and effluent and environmental monitoring equipment. Each building having a potential for a nuclear accident has a list of dosimeters, criticality detectors, and alarms, as well as a drawing showing their location in relation to prominent facility features.

DOE/RL94-02 Rev. 0 Chapter 10, Section 10.3

10.3 MAINTENANCE AND TESTING OF ALARM AND COMMUNICATION SYSTEMS

The Facility manager or BED shall ensure that preventive maintenance is performed on the following equipment by the responsible maintenance organizations, in accordance with established preventative maintenance procedures:

* Area/building evacuation alarms
* Area/building take cover alarms
* Area public address systems (if used for emergency evacuation instructions).

5.4.3 Communications Equipment

29CFR1910 Part 38(a)(3)

Employee emergency plans and fire preventions. Emergency action plan. 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.

29CFR1910 Part 165(b)(1)

Employee alarm systems. General requirements. 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.

29CFR1910 Part 165(b)(2)

Employee Alarm systems. General requirements. The employee alarm shall be capable of being perceived above ambient noise or light levels

5.0 EMERGENCY MANAGEMENT

by all employees in the affected portions of the workplace. Tactile devices may be used to alert those employees who would audible or visual alarm.

29CFR1910 Part 165(b)(3)

Employee Alarm systems. General requirements. 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.

29CFR1910 Part 165(b)(4)

Employee Alarm systems. General requirements. 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.

29CFR1910 Part 165(b)(5)

Employee Alarm systems. General requirements. 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.

WAC-173-303 Section 340(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, 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, and decontamination equipment, where required, must be tested and maintained as necessary to assure its proper operation in time of emergency.

WAC-173-303 Section 340(2)

Access to communications or alarms. Personnel must have immediate access to the signalling 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.

5.0 EMERGENCY MANAGEMENT

5.5.1 Event Classification and Emergency Action Levels (EALs)

DOE/RL94-02 Rev. 0 Chapter 4, Section 4.3

Emergency Action Levels
Facility-specific emergency action levels shall be developed for all Hanford Site DOE facilities in accordance with DOE Order 5500.2B and the Emergency Management Guide (DOE 1991b) regarding Hazards Assessment and Event Classification.

DOE/RL94-02 Rev. 0 Chapter 4, Section 4.3.4

On determination that an event has occurred at or affecting a Hanford Site facility, the BED shall promptly assess the conditions, compare the indications to the facility EAL set, and determine the appropriate emergency class. Immediate actions, activation of the emergency response organization, and appropriate notifications are then carried out.

DOE5000.3B Section 7.a.

Categorization. Categorization of Reportable Occurrences shall be made as soon as practical and, in all cases, within 2 hours of identification. If categorization is not clear, then the occurrence shall be initially categorized at the higher level being considered and DOE notified in accordance with this Order. The occurrence categorization shall either be elevated, maintained, or lowered as information is made available. The categories of Reportable Occurrences are:

DOE5000.3B Section 8.a.(1)

Occurrence Categorization and Notification Process.
The facility staff and operators shall identify and promptly notify the Facility Manager of abnormal events and conditions and record and archive all information pertaining to such occurrences.

DOE5000.3B Section 8.a.(3)

The Facility Manager shall categorize the occurrence as required in Paragraph 7a of this Order utilizing the facility specific procedures developed in accordance with Paragraph 8d(2) of this Order. For occurrences resulting from and directly related to a previously identified cause which is currently documented in a nonfinalized Occurrence Report, the Facility Manager, with concurrence from the Facility Representative and Program Manager, may submit a 10-Day Update Report in lieu of a new Occurrence Report.

5.5.2 Notifications and Staff Augmentations

40CFR 355 Part 40(a)(1)

The requirements of this section apply to any facility:

(i) at which a hazardous chemical is produced, used or stored and

(ii) at which there is release of a reportable quantity of any extremely hazardous substance or CERCLA hazardous substance.

40CFR 355 Part 40(b)(2)

Emergency release notification. Notice requirements. 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.

(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.

5.0 EMERGENCY MANAGEMENT

DOE/RL94-02 Rev. 0 Chapter 6, Section 6.1.1

Initial Notifications

The initial event classification shall be made by the BED. The BED shall initiate necessary notifications to onsite personnel via sirens, crash alarms, or telephone so that they may take appropriate protective actions. The BED also provides notification, using the Emergency Notification Form to the ONC.

DOE/RL94-02 Rev. 0 Chapter 6, Section 6.1.2

6.1.2 Offsite Notification

Upon classification of an event as an Alert, Site Area Emergency, or General Emergency, the BED shall be responsible for ensuring that notification is made to the ONC via telephone.

DOE5000.3B Section 7.b.

Notification. The emphasis for both oral and documented notifications is on providing clear and succinct descriptions of the occurrence, and brief, concise descriptions of both the operating conditions of the facility at the time of the occurrence and the immediate actions taken, including results, if known. Requirements for oral and documented notification of Reportable Occurrences are as follows:

(1) Emergencies. Oral notification to DOE and offsite authorities of emergencies shall be made within 15 minutes or less of categorization. However, recognizing that the majority of, if not all, emergency occurrences will result in generating external interest, oral notification to DOE should be accomplished as soon as possible. Emergency criteria are defined by DOE Order 5500.2B. Facility implementation procedures for DOE Order 5500.2B should identify the specific criteria for emergencies. These should b included or referenced in the facility specific procedures developed as required by Paragraph 8d of this Order. If requirements of DOE Order 5500.2B have been implemented, then all oral notification requirements shall be satisfied in accordance with DOE Order 5500.2B. A Notification Report shall be prepared and submitted 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).

(2) Unusual Occurrences. Oral notification to DOE of unusual occurrences shall be as soon as sufficient information is obtained to indicate the general nature and extent of the occurrence but, in all cases, within 2 hours of categorization. However, oral notification to DOE should be accomplished as soon as possible for those occurrences judiciously determined to likely generate external interest. A Notification Report shall be prepared and submitted before the close of the next business day from the time of categorization (not to exceed 80 hours).

(3) Off-Normal Occurrences. For off-normal occurrences, oral notification to DOE is not mandatory; however, a Notification Report shall be prepared and submitted before the close of the next business day from the time of categorization (not to exceed 80 hours).

(4) Categorization Changes. Any changes in categorization shall be documented in a 10-Day Occurrence Report and submitted before the close of the next business day from the time of recategorization(not to exceed 80 hours). A justification for the new categorization shall be included in the report.

DOE5000.3B Section 7.c.

Follow-up Notification. In addition to the initial oral notifications required in Paragraph 7b, follow-up oral notification shall also be made to DOE for any of the following:

(1) Any further degradation in the level of safety of the facility or other worsening conditions, including those that require the declaration of any emergency class as defined by DOE Order 5500.2B, if such a declaration has not been previously made;

(2) Any change from one emergency class (as defined in DOE Order 5500.2B) or category (as defined by this Order) to another; or

(3) Termination of an emergency.

DOE5480.19 Attachment I, Chapter VII, Section C.1

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

5.0 EMERGENCY MANAGEMENT

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.

DOE5480.19 Attachment I, Chapter VII, Section C.2

The operations supervisor should ensure that all appropriate personnel receive notification when required. The actual notification of specific individuals or agencies may be accomplished by other individuals.

DOE5480.19 Attachment I, Chapter VII, Section C.4

All notifications should be documented. Fill-in-the-blank forms for different types of situations might be useful as a checklist and for providing necessary documentation. In any case, a formal record of notifications should be maintained.

WAC-173-303 Section 360(2)(d) and (e)

360 (2) (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:

360 (2) (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

360 (2) (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).

360 (2) (e) His assessment report must include:

360 (2) (i) Name and telephone number of reporter;

360 (2) (ii) Name and address of facility;

360 (2) (iii) Time and type of incident (e.g., release, fire);

360 (2) (iv) Name and quantity of material(s) involved, to the extent known;

306 (2) (v) The extent of injuries, if any; and

360 (2) (vi) The possible hazards to human health or the environment outside the facility.

5.5.3 Reporting and Event Investigations

DOE5000.3B Section 8.a.(10)

The Facility Manager shall prepare and submit the Notification Report (fields 1 through 18 of the Occurrence Report), and distribute it to the DOE Facility Representative and Program Manager before the close of the next business day from the time of categorization (not to exceed 80 hours). When an unclassified Notification Report is submitted using the computerized DOE ORPS data base, Paragraph 8c(1) below, the distribution requirement is automatically satisfied.

DOE5480.19 Attachment I, Chapter IV, Section C.1

Emergency Communications Systems
Methods should be implemented to ensure all facility personnel are promptly alerted to facility emergencies. When personnel are working in areas where the public address system or emergency signals cannot be heard, alternate methods for alerting these persons should be utilized. Flashing lights, personal pagers that vibrate and can be felt, and persons dedicated to notifications are examples of alternate methods that might

5.0 EMERGENCY MANAGEMENT

be effective.

Emergency communications systems should be periodically tested to ensure that they are functional. Control areas should have the capability of overriding other users of the public address system for emergency announcements.

WAC-173-303 Section 360(2)(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.

5.6.1 Event Containment and Consequence Assessment

29CFR1910 Part 120(q)(3)(ii)

Emergency response to hazardous substance release. Procedures for handling emergency response. The individual in charge of the ICS shall identify, to the extent possible, all hazardous substances or conditions present and shall address as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance handling procedures, and use of any new technologies.

DOE/RL94-02 Rev. 0 Chapter 4, Section 4.4.1.2

4.4.1.2 Water/Groundwater Monitoring. The water/groundwater monitoring and environmental surveillance programs required by DOE Order 5400.1 (DOE 1990)shall be used to characterize transport and diffusion of accidental releases of hazardous materials to aquatic pathways in the vicinity of a Hanford Site facility.

5.6.2 Protective Actions

DOE/RL94-02 Rev. 0 Chapter 5, Section 5.2.3.2 Sentences 1 thru 3

Protective Actions for Nonessential Personnel.
Facility management shall identify personnel that are not essential for facility operations. Nonessential personnel within areas impacted by an emergency may be required to shelter in place or evacuate. Predetermined criteria shall be developed for implementation of these protective actions.

DOE/RL94-02 Rev. 0 Chapter 5, Section 5.2.3.2 Sentences 4 & 5

Hanford Site contractors shall develop and maintain emergency procedures that provide for the timely implementation of protective actions for their personnel. These procedures shall include provisions for:

5.0 EMERGENCY MANAGEMENT

* Emergency signals to notify personnel of the action to take.
* Personnel with permanent or temporary disabilities.
* Staging areas.
* Personnel accountability.
* Transportation (where necessary).
* Interviews of evacuated workers to obtain information about the emergency.
* Radiological and hazardous materials monitoring and decontamination of personnel and equipment.
* Predetermined routes
* Determination of the area surrounding the specific facility actually affected by the Operational Emergency.

DOE/RL94-02 Rev. 0 Chapter 6, Section 6.1.3, Paragraph 3

The BED is responsible for making notifications for the purpose of onsite protective actions. These include actuating appropriate facility sirens or notifying appropriate personnel to actuate facility sirens, and notifying the POC to make crash alarm notifications and/or actuate area sirens.

DOE/RL94-02 Rev. 0 Chapter 1, Section 1.3.1, Paragraph 4, Sentences 1&2

For each emergency class there shall be predetermined recommended actions. These actions shall include those steps necessary to protect workers, equipment, and the environment.

5.6.3 Accountability and Evacuation

DOE/RL94-02 Rev. 0 Chapter 5, Section 5.2.3.5

5.2.3.5 Personnel Accountability. Personnel Accountability shall be conducted following implementation of protective actions to ensure that employees are properly accounted for and that the affected area has been evacuated as necessary.

DOE/RL94-02 Rev. 0 Chapter 10, Section 10.2.3

10.2.3 Evacuation Buses/Vehicles

The BEDs shall ensure that vehicles are available to move all personnel from their facility. This may be accomplished by a combination of government-owned and private vehicles. If insufficient vehicles are available, evacuation buses and sufficient drivers shall be available as required to transport all building occupants.

5.6.4 Emergency Medical Response Capability

29CFR1910 Part 120(q)(9)(ii)

Any emergency response employees who exhibits signs or symptoms which may have resulted from exposure to hazardous substances during the course of an emergency incident, either immediately or subsequently, shall be provided with medical consultation as required in paragraph (f)(3)(ii) of this section.

5.7.1 Reentry

DOE/RL94-02 Rev. 0 Chapter 8, Section 8.2

8.2 REENTRY

The BED or Event Commander will be responsible for determining appropriate protective measures for personnel reentering the event facility or area,and for ensuring that the reentry team receives a safety briefing.

DOE/RL94-02 Rev. 0 Chapter 8, Section 8.2.1 Paragraph 3, Sentence 2

8.2.1 Reentry Exposure Considerations

The limits for radiation exposure for reentry activities shall be in accordance with the Hanford Site Radiological Control Manual (HSRCM-1) (DOE 1992b).

5.0 EMERGENCY MANAGEMENT

5.7.2 Recovery

WAC-173-303 Section 360(2)(h) thru (j)

(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.

(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.

5.10.1 Drills and Exercise Program

DOE/RL94-02 Rev. 0 Chapter 12, Section 12.1.1

BEDs or BWs shall be responsible for the conduct and documentation of required facility drills, in accordance with contractor procedures. The BEDs/BWs will prepare predrill report forms for participating organizations. Post-drill reports will be provided to contractor emergency preparedness within two weeks after a drill.

5.10.2 Reviews, Audits and Evaluations

DOE5482.1B PREAMBLE Section 9

IMPLEMENTATION PROCEDURES. The quality, frequency, and depth of appraisals shall be commensurate with the hazard attendant with the respective operating activities; consistent with both the DOE policy of comparability and equivalence with similar regulatory programs; and consistent with DOE policy of protection of personnel, property, and the environment. Reviews and appraisals of DOE facilities and line organizations will be conducted, as appropriate, by the line organizations as part of line management's ES&H responsibility. EH-1 will conduct periodic overview appraisals, audits, and surveys, to confirm the adequacy of line management's reviews and appraisals.

5.10.4 Deficiency Identification and Correction

DOE/EH0135 EP.1.12

12. Timely and effective action is taken to track and correct identified emergency response deficiencies and their basic causes.

DOE/EH0135 EP.2.9

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

DOE/EH0135 EP.3.4

Continuing training maintains and improves emergency task-related knowledge and skills and includes items such as the following:
- Review of the items in #2, above;
- DOE, industry, and in house emergency operating experience, as appropriate;
- Changes in emergency operating policies, plans, procedures, facilities and equipment; and
- Weaknesses identified through conduct and review of the program including drills and exercises.

DOE/EH0135 EP.3.8

8. The effectiveness of the emergency preparedness training program is periodically evaluated; the results are documented and used to make program improvements.

5.0 EMERGENCY MANAGEMENT

DOE/EH0135 EP.4.12

12. Every drill and exercise is formally critiqued with all players, controllers, and evaluators and the results are documented. A system deficiency identification, evaluation, analysis, and follow-up is established to ensure weaknesses and deficiencies are corrected, thereby strengthening the emergency management system.

DOE/RL94-02 Rev. 0 Chapter 12, Section 12.1, Paragraph 4

Corrective actions resulting from facility drills will be tracked and resolved by the BEDs/BWs. Verification of corrective action completion and effectiveness, will be conducted by the respective site contractor emergency preparedness organization during facility appraisals and surveillances.

DOE5482.1B PREAMBLE 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.

DOE5482.1B PREAMBLE Section 9.a(6)

Status reports should be provided on a quarterly basis to inform the appraising organization of the status of the corrective actions unless requested more frequently by the appraising organization.

DOE5482.1B PREAMBLE Section 9.a(7)

Follow up visits by a management representative may be required for the purpose of discussing the adequacy of corrective action and whether additional action is necessary. These discussions shall be confirmed in writing and, where no additional action is necessary, shall constitute formal closeout of the appraisal.

DOE5482.1B 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.

6.0 SAFEGUARDS AND SECURITY

6.0 SAFEGUARDS AND SECURITY

6.1 Management and Administration

DOE-M-5632.1C-Statement of Use

STATEMENT OF USE- DOE-M-5632.1C manuel will be used to implement the DOE 5632.1C order requirements.

DOE5632.1C Preamble, Section 7.d Introduction

Protection Planning. Protection planning is essential to all Departmental facilities and contractor facilities used for Department of Energy work. Sites, as appropriate, shall develop a Site Safeguards and Security Plan as required by DOE 5630.14A, SAFEGUARDS AND SECURITY PROGRAM PLANNING. Sites and facilities not covered by DOE 5630.14A should use the Order as guidance when developing local security plans.

DOE5632.1C Preamble, Section 7.d.(1)

Protection Strategy. A protection strategy shall be developed and delineated by each DOE site and approved by the Head of the Field Element for all safeguards and security interests. The strategy used will be determined by the impact that a malevolent act would have on the national security, program continuity, the health and safety of DOE and contractor employees, the public, and/or the environment. (NOTE: Safeguards and security programs shall provide a high degree of assurance of the capability to deter, detect, assess, delay, prevent, and/or inhibit unauthorized access to nuclear weapons, nuclear test devices, or completed nuclear assemblies, Category II or greater quantities of special nuclear material, and Vital Equipment. The safeguards and security system shall be capable of responding, denying access, preventing removal and/or recovering these Departmental assets from an adversary, while providing command and control to protective forces. Strategies for protection and control of classified matter shall incorporate the applicable requirements established in DOE M 5632.1C-1).

DOE5632.1C Preamble, Section 7.d.(2)

Contingency/Emergency Planning. Plans that address protection measures shall be developed and in place for events such as a threat guidance event, natural disasters, civil emergencies, personnel shortfalls (e.g., work force shortfalls, work force disruptions, walkouts, disputes), call-out of off-duty employees, and other credible situations.

RLID5632.1B Section 6.c

Asset owners or designee shall appoint security focal point(s) who will be responsible for coordinating all security concerns, relative to the facility, with their Security Organization. Additional responsibilities shall include:

(1) Ensuring adequate access control measures are instituted and maintained

(2) Posting required signs

(3) Managing facility lock and key program

(4) Ensuring all security requirements/procedures are met as outlined in their contractor Security Manual

(5) Ensure that all facility occupants are knowledgeable of their security responsibilities

(6) Maintaining necessary security reference materials

(7) Providing adequate visitor control measures

(8) Complete an Asset Protection Review with the assistance of their Security Organization.

6.2 Personnel Security

DOE1240.2B Preamble, Section 9.a

Origination and Processing . Requests for unclassified foreign national visits and assignments originate in various ways: with field elements or DOE contractors; with Headquarters offices, or with foreign entities. All assignments require the use of DOE F IA-473, as do certain visits, as specified in paragraph 9b, below. (See foreign nationals proposed for visits or assignments.) For a visit not requiring use of DOE F IA-473 to an access-controlled facility, the visit shall be documented and a record kept to show the name, date of birth, place of birth, and nationality of the

6.0 SAFEGUARDS AND SECURITY

visitor, the date(s) of the visit, the host(s), and the purpose.

DOE1240.2B Preamble, Section 9.g

Security Plans . The main defense for vital information is the imitation of its exposure, and a security plan is the basic means to accomplish that. When a specific or generic security plan is to be used, it shall be approved by the appropriate DOE Field office before the visit occurs. A generic plan may be appropriate in many cases. Such circumstances may be continuing programs, e.g. training courses operated by DOE, non-sensitive foreign nationals visiting non-sensitive facilities or sensitive facilities, and sensitive foreign nationals visiting non-sensitive facilities. Specific security plans are required for visits and assignments:

(1) to any security facility;
(2) dealing with sensitive subjects; and
(3) by a foreign national of a sensitive country to a sensitive facility. To ensure that security plans are adequately implemented, persons assigned as escorts to visitors, or who receive visitors, shall be briefed on all aspects of the security plan for their particular visitors prior to the visit. When a visit or assignment by a sensitive country national occurs at a facility located adjacent or near a security or sensitive facility, the local Operations Security Committee will review the visit or assignment to assure that operational security concerns are met.

DOE1240.2B Preamble, Section 9.q

Equipment Maintenance Person. Emergency repair of critical equipment may on occasion require timely access by a foreign national to a DOE facility. Those individuals potentially requiring such access shall normally be prescreened as intermittent assignees before their initial access is necessary.

DOE5631.1C Section 8.b

Scheduling. Each individual shall receive the initial security briefing prior to assuming duties. Initial and comprehensive briefings may, at the discretion of the facility, be conducted simultaneously. Under such circumstances, the subject requirements shall be included as prescribed by both initial and comprehensive criteria.

DOE5631.1C Section 10.b

Scheduling. Refresher briefings are mandatory for all individuals possessing active DOE access authorizations.

(1) Annual refresher briefings shall normally be conducted each calendar year at approximately 12-month intervals.

(2) Responsible security offices shall coordinate attendance at refresher briefings with security or administrative representatives of organizational elements with the scope of their security authority.

DOE5631.1C Section 11.b

Scheduling. Termination briefings shall be given either on the last day of employment, the last day the person possesses a security clearance, or when the person no longer requires access to classified matter, whichever is sooner.

DOE5631.2C Chapter I, Section 1

GENERAL. Requests for investigation shall be submitted only after a determination has been made that the duties of a position require access to classified information or special nuclear material in quantities defined in the DOE 5632 Order series, or access to an Exclusion Area. Security clearances are not to be requested to alleviate individual or management responsibilities for properly safeguarding classified information or controlling dissemination of such classified information on a need-to-know basis, or to preclude the use of access controls or physical barriers to distinguish between classified and unclassified areas or facilities, or to determine suit ability for Government employment. It is Departmental policy that clearances shall be granted only when absolutely required and at the level of access required to avoid the unnecessary expenditure of and resources or the unwarranted invasion of an individual's right to privacy.

DOE5631.2C Chapter II, Section 2

PREPARING THE REQUEST.

a. Before a request for investigation or access authorization is submitted, to following determinations should be made:

(1) The access authorization required (guidelines contained in Chapter I).

6.0 SAFEGUARDS AND SECURITY

(2) Whether the individual has previously been granted access authorization that can be reinstated, transferred, or extended.

(3) Whether the individual has been granted a security clearance by another Government agency and, if so, all available information relating to such clearance (date, place, level, whether active or terminated, and so forth).

(4) Whether the individual is a foreign national or dual citizen requiring Secretarial Officer approval prior to processing for investigation (see Chapter VI).

b. Types of access authorizations and forms required to process each are indicated on Attachment II-1.

DOE5631.2C Preamble, Section 7.b

DOE contractors may not request clearances for the purpose of establishing cleared pools of potential employees or to alleviate responsibilities for escorting uncleared individuals within a security area. A clearance shall be requested only for individuals who have been offered employment or for personnel who are expected to fill projected vacancies or requirements.

DOE5631.4A Preamble, Section 8.a

PROCEDURES.

a. Control of Classified Visits. Procedures for control of classified visits should assure:

(1) Establishment of the identity and access authorization (security clearance) of the visitor;
(2) Observance of limitations on access to classified information or facilities;
(3) Timely notification of visits to appropriate persons; (DOE F 5631.20), when applicable;
(4) Prompt transmittal of "Request for Visit or Access Approval" (DOE F 5631.20), when applicable;
(5) Prompt notification to those concerned of approval for access to weapon data (classified secret or top secret), top secret information (nonweapon data), sensitive nuclear material production information, inertial confinement fusion data, advanced isotope separation technology, uranium enrichment technology, or facilities specifically designated by Headquarters Elements;
(6) Use of continuing visitor access approval when it is necessary for individuals to visit DOE facilities frequently. This approval cannot exceed a period of one year, but the approval may be renewed annually, if necessary;
(7) Operational approval of visits is granted or obtained;
(8) Maintenance of records of all classified visits by non-DOE personnel and foreign nationals; and
(9) Referral to the Director of Public Affairs of any nonroutine, written, or visual material proposed for public release resulting from visits.

DOE5631.4A Preamble, Section 8.j

Emergency Visits to Classified Areas and Facilities.

(1) In an emergency, requests for visit approval may be made by teletype, telecopier, or telephone; and
(2) Telephone requests must be confirmed by teletype or memorandum.

RLID5632.1B Section 7.1.e

Facilities that require "Public Access Area" designation shall meet the following criteria:

(1) Public access areas are not authorized north of the Wye Barricade.

(2) The area must be generally used by non-Hanford personnel and/or the work or service provided by the facility must pertain to the public, e.g., Hanford Science Center, Hanford Environmental Health Foundation Medical Exam Section, Hazardous Materials Management and Emergency Response (HAMMER), etc.

(3) Public Access Areas may not contain any equipment, processes or material, the loss of which would cause unacceptable impact to the DOE, the contractor, national security or health and safety of the public.

(4) Sensitive Information, Classified security interests, or SNM may not be stored within Public Access Areas.

(5) Signs shall be posted that clearly demarcate the Public Access Area.

6.0 SAFEGUARDS AND SECURITY

(6) Security Areas (to include PPAs) adjacent to Public Access Areas must have the appropriate physical security measures in place that preclude unauthorized access.

(7) Electronic communications equipment that can access sensitive information, e.g., Hanford Local Area Network shall not be available to visitors.

(8) Visitors to Public Access Areas shall not be required to be escorted.

(9) The wearing of Security Badges is not required within Public Access Areas.

(10) Visitors must be notified of any special instructions pertaining to Security Areas located adjacent to/within the Public Access Area.

(11) A detailed description of the Public Access Areas and application of the above criteria must be included within the Asset Protection Agreement.

RLID5632.1B Section 7.5.a

Visitors to Hanford Site facilities will be badged according to procedures developed by each Security Organization and approved by SAS. Standard visitor badge procedures shall be consistent for all LAs and PPAs. In leased/private facilities (Richland, Kennewick, etc.) a Building Specific badge may be issued to a U.S. citizen visitor who arrives at the facility on official business, without processing through a badging office.

RLID5632.1B Section 7.5.b

Visitor logs are not required for PPAs.

RLID5632.1B Section 7.5.c

Visitor logs are required for LAs and will include the name, signature, organization, and citizenship of each uncleared visitor to a LAs, persons visited, escort names and signatures (if applicable), purpose of visit, and time in and out.

RLID5632.1B Section 7.5.d

Visitors (from the general public sector) to Public Access Areas are not required to wear/possess a security badge, nor be escorted. Also, visitors must be notified of any special instructions pertaining to security areas located adjacent to/within the public access area.

6.3 Protection Program Operations

RLID5632.1B Section 7.1.c

To Arrive at an asset protection strategy, the asset owner, in conjunction with his/her Security Organization, shall perform an Asset Protection Review using Attachments 8.1 and 8.2. The review (as documented on the Asset Protection Agreement, Attachment 8.2) shall identify threat(s) to the asset, asset value, strategic business impact(s), any unacceptable risks involved with the protection strategy, concurrence of the appropriate Security Organization, and signature of the person responsible for the Asset Protection Strategy (asset owner).

RLID5632.1B Section 7.1.d

If it is determined after completion of the asset protection review, that administrative controls are adequate for access control, the asset owner shall consider protection of certain assets by locking internal office doors, use of PC lockdown devices, storing assets in a storage container, etc. Administrative controls may only apply during the day shift, Monday through Friday. Day shift is defined as the working hours of the majority of the facility occupants. All facilities shall be locked between 6:00 p.m. and 6:00 a.m., unless pre-approved by asset owners in conjunction with the affected contractor security organization, or in consideration of special operational requirements (24-hour manned facility) as documented in an approved Asset Protection Agreement. All unoccupied facilities shall be locked.

(1) Specific Facility check procedures shall be established (e.g., end of shift lock up).

(2) A sign shall be installed at the main entrance indicating entry/access requirements and/or instructions. The asset owner should consider installing a telephone at the main entrance so visitors can call the person they are visiting, if necessary.

(3) When administrative controls are used as an access control measure, certain types of low-level assets (Category IV D SNM, precious

6.0 SAFEGUARDS AND SECURITY

metals, explosives, drugs) shall be secured as required in applicable directives. Examples are precious metals as required by Property Management directives and Category IV D, as required by DOE Order 5632.2A.

RLID5632.1B Section 7.1.g

The completed "Asset Protection Agreement," Attachment 8.2 to this directive, shall be used as the approved security plan for those facilities meeting the Asset Protection Requirements. For those facilities which do not meet the minimum protection requirements identified in the Asset Protection Template (Attachment 8.1), the Asset Protection Agreement (Attachment 8.2) must be approved by RL SAS with the concurrence of the appropriate RL Program Office. Unresolvable disagreements between the asset owner and Contractor Security Organization as to the appropriate protection strategy to apply, shall be resolved by RL SAS and the appropriate RL Program Office. Additionally, appropriate justification shall be completed and approved by the funding source in those situations where management or the client chooses to exceed the minimum protection criteria. This justification shall include the incremental cost of the added protection and which program/funding source will bear the cost.

RLID5632.1B Section 7.1.h

Contractor's security manual shall, as a minimum, address the requirements outlined in this Directive.

6.3.1 Physical Security

DOE5632.1C Preamble, Section 7.e.(4)

Barriers.
Permanent physical barriers shall be installed to control, deny, impede, or delay unauthorized access into Limited Areas, Protected Areas, Exclusion Areas, Material Access Areas, and Vital Areas.

DOE5632.1C Preamble, Section 7.e.(5)

Locks.
Security locks shall be used to secure safeguards and security interests.

DOE5632.1C Preamble, Section 7.e.(6)

Secure Storage.
Secure storage for the interest under protection shall be provided in a graded manner.

DOE5632.1C Preamble, Section 7.e.(1)

Security Areas and Restricted Access Areas.

(a) Security Areas, described more fully in DOE M 5632.1C-1, shall be established when the nature, size, revealing characteristics, sensitivity, monetary value, or importance of safeguards and security interests is such that access to them cannot otherwise be effectively controlled. Limited Areas, Protected Areas, Exclusion Areas, Vital Areas, and Material Access Areas shall be defined by barriers and access to them shall be controlled. Property Protection Areas may be defined by barriers and access to them may be controlled.

(b) Restricted Access Areas, described in DOE M 5632.1C-1, may be established for the purpose of controlling access based on the appropriate access authorization and/or official duties.

DOE6430.1A Division 1, Section 0110-13.3

Physical Barriers
Physical barriers shall protect DOE property and facilities as follows:

o Barriers such as walls or fences are intended to control or impede access.

o Unoccupied facilities shall be locked with tamper-resistant locks. A system of accountability and positive controls for keys and combinations shall be in place.

RLID5632.1B Section 7.3.b

Access control shall be provided according to the Asset Protection Template (Attachment 8.1). The number of frequently used entrances to a facility shall be limited. It is the host's responsibility to assist visitors requiring entry into the facility.

6.0 SAFEGUARDS AND SECURITY

RLID5632.1B Section 7.4.a

The designated security focal point shall ensure the minimum physical security requirements are met for each facility. Minimum requirements will be established, per the Asset Protection Template (Attachment 8.1) and applicable DOE Orders/Directives. Generic requirements for all levels of physical protection include:

(1) Signs shall be posted around the perimeter and at the main entrances to each facility, as stated in the Asset Protection Agreement, which prohibit trespassing, list prohibited articles, and advise personnel that vehicles and their hand carried items are subject to search. At government-owned facilities, the standard DOE "Atomic Energy Act, No Trespassing" sign will be used. At government-leased facilities, contractor security organizations shall consult with their Office of Legal Counsel for the posting of locally developed "No Trespassing" signs. These signs will contain language which complies with the required DOE wording. When access points and the perimeter of fenced areas are sufficiently posted with signs, then facilities within the area do not require signs unless the access requirements are more restrictive than the area itself.

In addition to the signs above, Prohibited Article signs shall be posted in accordance with RLID 5632.PA, PROHIBITED ARTICLE POLICY.

(2) Unoccupied/abandoned facilities shall be locked.

(3) There is no requirement to install door locks on interior offices requiring only low-level security protection. However, at the discretion of facility management, in conjunction with their Security Organization, interior locks may be installed. If interior locks are installed, issuance and records management of the keys/combinations will be the responsibility of facility management.

RLID5632.1B Section 7.4.b

When determining the physical security requirements of assets the following shall be considered:

(1) Value of the asset(s)
(2) Portability
(3) Attractiveness
(4) The applicable/credible threat (against the matter located in the area)
(5) A review of any property losses and/or adverse security trends associated with the assets.

DOE5632.1C Preamble, Section 7.e.(7)

Protective Personnel/Protective Force. Protective personnel are an essential part of the physical protection program. Such personnel include the Protective Force as well as other persons having administrative or other protective duties. Protective force policy, responsibilities and requirements are stated in DOE 5632.7A, PROTECTIVE FORCES.

6.3.2 Security Systems

DOE5632.1C Preamble, Section 7.e.(3)

Access Controls and Entry/Exit Inspections.

(a) Access to classified matter and special nuclear materials shall be limited to persons who possess an appropriate access authorization and who require such access in the performance of their official duties, on a need-to-know basis.

(b) A person without appropriate access authorization (security clearance), who is otherwise authorized to enter a Limited Area, Exclusion Area, or Protected Area (including Material Access Area or Vital Area within a Protected Area) shall be escorted at all times within the Security Area by an individual with the appropriate access authorization.

(c) Personnel, hand-carried items, vehicles, and vehicle contents shall be subject to inspections, as applicable, at Security Area entry control points to deter the introduction of prohibited articles. Personnel, hand-carried items, vehicles, and vehicle contents shall be subject to inspections, as applicable, at Security Area exit control points to deter the unauthorized removal of safeguards and security interests.

6.0 SAFEGUARDS AND SECURITY

DOE5632.1C Preamble, Section 7.e.(2)

Intrusion Detection System and Assessment Capability. Intrusion detection systems may be used to detect unauthorized entry and/or presence in Security Areas and Restricted Areas. Visual observations by protective personnel may be used in place of or to complement an intrusion detection system depending on the requirements for the area being protected. See DOE M 5632.1C-1, page IV-3, for their required use at Protected Areas, Vital Areas, Material Access Areas, and Exclusion Areas.

DOE5632.1C Preamble, Section 7.e.(9)

Testing and Maintenance.

(a) Physical protection systems' effectiveness shall be determined through acceptance and validation testing that is consistent with DOE 5630.16A, SAFEGUARDS AND SECURITY ACCEPTANCE AND VALIDATION TESTING PROGRAM.

DOE5632.1C Preamble, Section 7.f Sentence 1 and 2

Physical Protection Equipment Usage. Programs and procedures shall be developed to deter and/or detect misuse of physical protection equipment (e.g., video assessment equipment). Violations shall be reported to the local cognizant authority for safeguards and security.

6.3.4 Security Identification Badges and Passes

DOE5632.1C Preamble, Section 5.e

Security badge systems employing a standard DOE format shall be used at DOE and DOE contractor facilities and operations involving access of 30 or more people to safeguards and security interests and/or Security Areas. Less than 30 person operations shall only be excepted from the security badge system requirement when nature of activities and involvements permit adherence to a personal recognition system which provides similar high levels of assurance that unauthorized persons will not be allowed access to Security Areas, facilities, classified matter, or other security interests.

DOE5632.1C Preamble, Section 7.g

Security Badges. Security badge systems shall indicate individuals access limitations and/or approvals for the purpose of controlling entrance and exit to Security Areas and facilities and for Safeguards and Security-related identification purposes. Access limitations indicated by badges shall not be used alone for the release of classified and/or sensitive matter. Need-to-know determinations shall be made before granting individuals access to classified matter.

6.3.5 Incident Response and Management

DOE5639.3 Chapter I, Section 2

REPORTING PROCEDURES. The method and sequence of the reporting of violations, losses, and incidents of security concern will depend upon the situation as well as the immediacy of action which may be required to mitigate' the situation. Reports of violations, losses, and incidents of significant
security concern to DOE which require immediate oral reporting shall be made in accordance with DOE 5000.3A. Appropriate security incident reports in the form of a memorandum, teletype, telefax, facsimile, or other electronic means shall be submitted to the appropriate authorities as soon as the required
information becomes available.

6.3.6 Transportation Security

DOE5633.3B Chapter II, Section 5, Introduction

MATERIAL TRANSFERS. Each facility shall have a program to control and account for internal and external facility transfers of nuclear materials. This program shall include documented procedures that specify requirements for authorization, documentation, tracking, verification, and response to abnormal situations that may occur during transfer of nuclear materials. For additional details, see page II-19, paragraph 7. Page II-19, paragraph 7, provides specific directions for preparing and submitting DOE/NRC F 741, "Nuclear Material Transaction Report," and DOE forms required for documenting external transfers for materials accounting purposes.

DOE5633.3B Chapter II, Section 5.b

Internal Transfers.

(1) Each facility's management shall provide a graded system of measurements and records to reflect the flow of material between Material

6.0 SAFEGUARDS AND SECURITY

Balance Areas within that facility and between it and other facilities on the same site.

(2) The facility control system shall be designed to monitor transfer activities and to deter and/or detect unauthorized removal of material during transfers. The system should flag abnormal situations, e.g., when inappropriate transfers of quantities and/or materials are made, when unauthorized personnel receive or ship materials.

(3) Transfers shall be documented on nuclear material transfer forms, or an electronic equivalent, that contain required information, are prepared and distributed within established timeframes, and are signed by authorized custodians or their alternates.

(4) Materials shall be subjected to a transfer check within one workday after receipt. These checks shall include verification of shipping container or item count, tamper-indicating devices integrity, and identification number. These transfer checks shall be compared to appropriate documentation. All irradiated special nuclear material requires only a transfer check.

(5) If the isotope content of special nuclear material (excluding uranium enriched below 20 percent U-235) transferred between Materials Balance Areas is 50 grams (fissile) or more, the transfer shall be measured, or a confirmatory measurement made, by the receiver. Measurements are not required for transfers that:

(a) Consist of assembled components in which the special nuclear material is physically inaccessible;
(b) Are sent to laboratories or nondestructive analysis measurement areas for analysis or examination under conditions which provide adequate internal controls to maintain a continuous awareness of the location and integrity of the special nuclear material until it is returned;
(c) Are tamper-safed and contain only Category III or IV quantities of material; or
(d) Consist entirely of small items containing less than 25 grams each and for which unauthorized accumulation of a Category III quantity of material is not credible. Measurements shall be accomplished in accordance with the schedules shown in Figure II-1. Materials not amenable to measurement may be subject to measurement requirements in accordance with paragraph 5a(4)(g).

(6) Documented acceptance/rejection criteria shall be established and used to evaluate measurement data for internal material transfers. In addition, procedures shall specify notification and response requirements if material removal or another abnormal situation is detected. These requirements shall be consistent with page I-13, paragraph 5, and DOE 5000.3B.

6.4 Material Control and Accountability for Special Nuclear Material

DOE5633.3B Chapter I, Section 1.c

A management official responsible for the control and accountability of nuclear materials shall be designated for each facility. This official shall be organizationally independent from responsibility for other programs. A Nuclear Materials Representative responsible for nuclear materials reporting and data submission to the Nuclear Materials Management and Safeguards System shall be designated for each facility or site having a Reporting Identification Symbol.

DOE5633.3B Chapter I, Section 1.d

For each facility, facility management shall maintain documentation defining authorities and responsibilities for material control and accountability functions (e.g., accounting system, measurements, measurement control, inventories, audit, material access controls, and surveillance). For each facility, there shall be a program to assure that personnel performing materials control and accountability functions are trained and qualified to perform their duties and responsibilities, and are knowledgeable of requirements and procedures related to their functions.

6.4.1 Material Control and Accountability Plan

DOE5633.3B Chapter I, Section 1.e

An Material Control and Accountability Plan shall be developed for each facility possessing nuclear materials (including facility review and frequency and change control), and approved by the cognizant Manager, Operation Office. The Materials Control and Accountability Plan may, at the option of the cognizant Manager, Operation Office, be a separate document or a part of an existing document such as a Site Safeguards and Security Plan.

6.0 SAFEGUARDS AND SECURITY

(1) Category I and II. For facilities possessing Category I and II quantities of special nuclear material, the plan shall reflect requirements for material control and accountability program planning and management, threat considerations, performance criteria, the accounting system, physical inventories, measurement control, control limits, loss detection elements, training, response to nuclear material alarms, access control, anomaly resolution, containment, and surveillance.

MATERIAL TYPE	SNM SOURCE, OR OTHER	REPORTABLE WEIGHT FIELDS USED FOR REPORTING QUANTITY*	ELEMENT	ISOTOPE	MATERIAL TYPE CODE
Deleted Uranium	SOURCE	Kilogram	Total U	U-235	10
Enriched Uranium 1	SNM	Gram	Total U	U-235	20
Normal Uranium	SOURCE	Kilogram	Total U		81
Uranium-233	SNM	Gram	Total U	U-233	70
Plutonium-242 2	SNM	Gram	Total Pu	Pu-242	40
Plutonium-239-241	SNM	Gram	Total Pu	Pu-239 Pu-241	50
Plutonium-238 3	SNM	Tenth of Gram	Total Pu	Pu-238	83
Americium-241	OTHER	Gram	Total Am	Am-241	44
Americium-243	OTHER	Gram	Total Am	Am-243	45
Berkelium	OTHER	Microgram		Bk-249	47
Californium-252	OTHER	Microgram		Cf-242	48
Curium	OTHER	Gram	Total Cm	Cm-246	46
Deuterium	OTHER	Tenth Kilogram	D 2 O	D 2	86
Lithium-6	OTHER	Kilogram	Total Li	Li-6	60
Neptunium-237	OTHER	Gram	Total Np		82
Thorium	OTHER	Kilogram	Total Th		88
Tritium 4	OTHER	Hundredth Gram	Total 3 H		87

Figure I-1
Nuclear Materials

* For reporting purposes: materials are reported to the nearest whole unit except for plutonium-238, deuterium, and tritium.

1 Uranium in cascades is treated as enriched uranium. For reporting purposes uranium in cascades should be reported as material type 89.

2 Report as plutonium-242 if the contained Pu-242 is 20% or greater of total Plutonium by weight; otherwise report as plutonium 239-241.

3 Report as plutonium-238 if the contained Pu-238 is 10% or greater of the total by weight Plutonium; otherwise report as plutonium 239-241.

4 Tritium contained in water (H 2 O or D 2 O) used as a moderator in a nuclear reactor is not an accountable material. For reporting purposes: if in the form of heavy water, both the element and isotope weight fields will be used; otherwise report isotope weight only.

(2) Category III and IV. For Category III and IV facilities, requirements for the scope and content of Material Control and Accountability Plans are to be determined by the Manager, Operations Office.

DOE5633.3B Chapter I, Section 1.f

Planning for materials control and accountability shall consider the potential of an insider threat, as detailed in "DESIGN BASIS THREAT POLICY FOR THE DEPARTMENT OF ENERGY (DOE) PROGRAMS AND FACILITIES (U)", issued by the Office of Security Affairs. Planning shall address the theft and diversion of special nuclear material, and the unauthorized control of a weapon, test device, or improvised nuclear device, where appropriate. The materials control and accountability program shall support activities to mitigate sabotage.

DOE5633.3B Chapter I, Section 1.g

For each facility, facility management shall have and require compliance with one or more current procedural directive(s) for implementing its

6.0 SAFEGUARDS AND SECURITY

Materials Control and Accountability Plan. These procedures shall be compatible with the physical protection and security requirements of the 5632.1C, PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS, to provide an effective integrated safeguards system. These procedural directives shall be transmitted to the cognizant Manager, Operations Office, when issued and when revised.

DOE5633.3B Chapter I, Section 1.h

Reportable occurrences shall be reported in accordance with the notification and reporting requirements contained in DOE 5000.3B, OCCURRENCE REPORTING AND PROCESSING OF OPERATIONS INFORMATION.

DOE5633.3B Chapter I, Section 1.i

Facility emergency plans shall address conditions that indicate possible loss of control of special nuclear material. The emergency plan shall be consistent with safeguards and security directives, and shall specify materials control and accountability measures to be taken prior to resumption of operations following emergency operations. Other requirements for facility emergency plans are specified in DOE 5500.1B, EMERGENCY MANAGEMENT SYSTEM.

DOE5633.3B Chapter I, Section 1.j

For Category I facilities and for Category II facilities within the same Protected Area for which rollup to a Category I quantity is possible, each facility's safeguards and security system shall provide defense-in-depth to assure that the failure or defeat of a single component will not increase the level of risk for the system above an acceptable level. A part of the vulnerability assessment process shall be to determine the extent to which the failure or defeat of a single component increases this risk and if the increase in risk is acceptable. When the increase in risk exceeds an acceptable level, compensatory measures shall be immediately taken and upgrades to the system shall be initiated. The acceptability of the risk shall be documented as a part of the Master Safeguards and Security Agreement or Site Safeguards and Security Plan for the facility.

DOE5633.3B Chapter I, Section 1.k

For each facility a materials control and accountability program shall be established for all nuclear materials on inventory under a three letter Reporting Identification Symbol, including those designated as uneconomical to recover. For Attractiveness Level D or higher special nuclear material that has been removed from inventory as waste and for which a vulnerability resulting in an unacceptable level of risk has been identified, the Manager, Operations Office, or the cognizant Head of a Headquarters Element may require that applicable nuclear material safeguards measures as outlined in this Order be maintained and/or implemented. Otherwise, materials previously removed from inventory that meet all of the following conditions are exempt from the requirements of this Order:

(1) They have been previously declared as waste prior to issuance of this Order;

(2) They have been written off the material control and accountability records; and

(3) They are under the control of a waste management organization.

DOE5633.3B Chapter I, Section 1.m

Identification of a facility for decommissioning, closure, or deactivation shall not exempt the facility from compliance with requirements stated in this Order. The facility's materials control and accountability program shall be maintained at a level appropriate to the category and attractiveness level of the nuclear material on inventory until a termination survey determines that there is no nuclear material remaining at the facility. Such a determination may be made if there is no material or the only material is waste material that meets the definition of Attractiveness Level E and that material has been written off the materials control and accountability books. Requirements for termination surveys are contained in DOE 5634.1B. After a facility has transferred all its nuclear material except waste to another facility, the inventory balance is zero, and the termination survey has been completed, DOE/NRC F 741, "Nuclear Material Transaction Report," may still be needed for reporting shipment of waste to offsite waste-handling areas. In such cases, the capacity shall be maintained for generating DOE/NRC F 741 for these shipments until the waste management program puts into use its own accounting system for transfers.

DOE5633.3B Chapter I, Section 1.n

A vulnerability assessment shall be performed for each facility to evaluate the potential for unauthorized accumulation of a Category I quantity of special nuclear material from multiple locations within the same Protected Area through either a single occurrence or protracted diversion. The vulnerability assessment shall include consideration of the attractiveness level of the material and the credibility of the removal scenarios. For protracted diversion, the vulnerability assessment shall also include consideration of the number of removal events and the total elapsed time required to accumulate the target quantity during the inventory period. Credible accumulation scenarios shall be documented in DOE-approved

6.0 SAFEGUARDS AND SECURITY

Site Safeguards and Security Plans.

DOE5633.3B Chapter I, Section 1.o

Procedures, techniques, and standards as promulgated by the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI) shall be used, when such standards exist, in developing the basis for nuclear material control, measurements and measurement control, accounting, and statistical methods that are employed by a facility for safeguarding of nuclear material, unless otherwise directed by DOE directives. Standards issued by the International Atomic Energy Agency and the Nuclear Regulatory Commission should also be used when appropriate and when consistent with DOE regulatory goals.

DOE5633.3B Chapter I, Section 1.q

The "Guide for Implementation of DOE 5633.3A" shall be considered in developing materials control and accountability programs. This guide does not establish or originate policy. Instead, it describes methods for meeting requirements of this Order.

DOE5633.3B Chapter I, Section 1.r

Nuclear materials designated as radioactive waste are subject to the requirements of this Order unless exempted from its requirements by paragraphs 1k or l above. In addition to requirements of this Order, the handling, disposal, and management of nuclear materials designated as radioactive waste must be in compliance with DOE environmental and waste management regulations including DOE 5820.2A, RADIOACTIVE WASTE MANAGEMENT.

DOE5633.3B Chapter I, Section 2.a

DOE Field Offices and facilities shall establish and follow a graded safeguards program for nuclear materials. Graded safeguards is the concept of providing the greatest relative amount of control and effort to the types and quantities of SNM that can be most effectively used in a nuclear explosive device. Categories of nuclear material for implementation of DOE's graded safeguards program are shown in Figure I-2. The "Guide for Implementation of DOE 5633.3A" contains more descriptive guidance for material attractiveness and examples of category determination.

DOE5633.3B Chapter I, Section 4.a

Vulnerability Assessment. Detailed vulnerability assessments identifying and evaluating the capability for detection of a loss of a Category I quantity of special nuclear material shall be developed by each Category I facility and approved by the head of the Operations Office materials control and accountability organization. Requirements for preparation of the Site Safeguards and Security Plan documents shall be used as the basis for these assessments. Vulnerability assessments shall cover the full threat spectrum specified in Office of Safeguards and Security guidance. Potential targets shall include all Category I areas and any Category II or III areas for which a credible scenario for unauthorized accumulation of a Category I quantity has been identified. Performance testing programs shall be developed to support and verify vulnerability assessments. Vulnerability assessments shall be reviewed annually and updated when system changes or new information indicate a potentially significant change in the risk of unauthorized removal of Category I quantities of special nuclear material. Results of reviews including changes in vulnerability assessments shall be documented and classified in accordance with CG-SS-3.

DOE5633.3B Chapter I, Section 4.b

Performance Testing. DOE 5630.16A, SAFEGUARDS AND SECURITY ACCEPTANCE AND VALIDATION TESTING PROGRAM, contains requirements for the design, planning, and documentation of performance tests. Material control and accountability performance testing programs shall meet the requirements of DOE 5630.16A. For each facility, management shall establish and implement a documented testing program to verify materials control and accountability procedures and practices and to demonstrate that material controls are effective.

(1) These tests shall be designed to demonstrate that the system is functional and to assure that the system performs as specified and/or required. In addition, facilities shall:

(a) Identify those components of the materials control and accountability system that provide the greatest effectiveness against theft and diversion;

(b) Design, conduct, and document tests which substantiate component effectiveness; and

(c) Integrate the results of these component tests into safeguards and security vulnerability assessments.

(2) Performance testing shall include not only those elements that can detect-in-time-to-prevent but also those elements that can effectively account for special nuclear material in order to provide assurance that

6.0 SAFEGUARDS AND SECURITY

DOE5633.3B Chapter I, Section 4.c

Material Control and Accountability Performance Requirements. Minimum performance requirements for selected materials control and accountability system elements are given in Figure I-4 on page 1-12. Validation of these system elements shall be accomplished by performance testing. Testing shall be established at a frequency which, at a minimum, shall be in accordance with DOE 5630.16A and shall be documented in the Materials Control and Accountability Plan. When these system elements fail to meet performance requirements, a corrective action plan shall be developed and where necessary compensatory measures shall be taken. Testing of access controls and material surveillance shall be facility-specific with the scope and the extent of the testing documented by facility management and approved by the Manager, Operations Office. A sufficient number of items and tamper-indicating devices shall be tested to assure that on an annual basis the performance requirements for tamper-indicating devices and accounting records are met with 95% confidence for Category I and II items. Confidence levels for Category III and IV items shall be approved by the Manager, Operations Office. Testing to assure that tamper-indicating devices are properly in place shall include checking to see that the tamper-indicating device has been properly applied and there is no indication that the integrity of the tamper-indicating device has been violated. (The testing for this requirement is not intended to require destruction of properly applied tamper-indicating devices whose integrity has not been violated.) Additional guidance for testing metal detectors is given in the "Metal Detector Guide." In the performance requirement for inventory differences, "throughput" means measured output including waste, and "active inventory" means those materials in the Materials Balance Area that enter into the limit-of-error calculation.

DOE5633.3B Chapter I, Section 5

OCCURRENCE INVESTIGATION AND REPORTING. Each facility shall identify materials control and accountability loss detection elements for each Materials Balance Area and shall establish a graded program for monitoring these elements and associated data to determine the status of nuclear material inventories and to identify reportable occurrences. Reportable occurrences involving Category I, II, and III nuclear materials shall be reported as an Emergency, Unusual Occurrence, or Off-Normal Occurrence in accordance with DOE 5000.3B. For reportable occurrences involving Category IV nuclear materials, the Manager, Operations Office, will define the extent of the investigation required to resolve the occurrence. When losses of Category IV nuclear materials which have been identified as credible radiological sabotage targets or when radiological sabotage events involving Category IV materials have occurred, reporting and investigation under DOE 5000.3B may be required. The categorization of materials control and accountability occurrences are contained in DOE 5000.3B. In addition to the reporting required by DOE 5000.3B, the DOE facility representative, as defined in DOE 5000.3B, shall notify the head of the appropriate division within the cognizant Operations Office responsible for the implementation of this Order. The head of the appropriate Operations Office division is responsible for notifying Office of Safeguards and Security and the local office of the Federal Bureau of Investigation of reportable occurrences for which there is both an indication of a loss of nuclear material and evidence of a malevolent act. In addition, the Operations Office shall independently evaluate the occurrence based upon its significance. Information related to monitoring and assessment activities shall be documented and retained.

DOE5633.3B Chapter I, Section 6.a

Facility materials control and accountability procedures shall be reviewed and approved (prior to implementation) by facility operations management at a level of authority sufficient to ensure compliance by operations personnel. Procedures shall be consistent with the approved facility Materials Control and Accountability Plan, and procedures shall be distributed to all applicable organizations and individuals in the facility having materials control and accountability responsibilities.

DOE5633.3B Chapter I, Section 6.b

For each facility, management shall establish procedures for emergency conditions and periods when material control and accountability system components are inoperative. These procedures shall be designed to assure that access to or removal of special nuclear material would be detected during these periods.

DOE5633.3B Chapter I, Section 6.c

For each facility, management shall establish controls that limit access to the accounting system and nuclear materials accounting data. For automated systems, controls shall be designed to deter and detect unauthorized access to the data bases and data processing systems that, through tampering, modification, or alteration could lead to defeat of the accounting system. Nuclear materials accounting data shall be protected in accordance with applicable classification, automated data processing, and computer security regulations.

DOE5633.3B Chapter I, Section 6.d

The facility nuclear materials accounting system shall include checks and balances, and be structured to ensure:

(1) Identification of omission(s) of data for any reportable transaction.

6.0 SAFEGUARDS AND SECURITY

(2) Timely detection (normally within 24 hours but in no case later than the subsequent inventory reconciliation) of errors/discrepancies in records associated with a Category I or II quantity of special nuclear material including where possible detecting falsified data and identifying the responsible person(s).

(3) Detection of data discrepancies and errors to ensure that no discrepancies exist in control indicator accounts.

(4) The completeness of the nuclear materials accounting system records.

DOE5633.3B Chapter I, Section 6.e

For each facility possessing nuclear materials, facility management shall establish a program to periodically review and assess the integrity and quality of the materials control and accountability system. The assessment program shall address normal operations and emergency conditions. The frequency of these assessments shall be on a graded basis, consistent with requirements of DOE 5634.1B, and approved by the Manager, Operations Office. The results of all assessments shall be classified if appropriate, reported to facility management, and each noted deficiency shall be addressed and corrected. The assessment shall be performed by personnel who are knowledgeable in materials control and accountability. Assessments shall be on a graded safeguards basis; at a minimum, the assessment program shall address the following:

(1) Identification of abnormal situations.

(2) Loss mechanisms, loss detection capabilities, and the localization of inventory differences.

(3) Selection, maintenance, calibration, and testing functions to assure proper equipment and system performance.

(4) Material control and accountability system checks and balances, including separation of duties and responsibilities, that are used to identify irregularities and detect tampering with materials or materials control and accountability system components.

(5) Change controls, including authorization requirements, to detect unauthorized or inappropriate modification of system components, procedures, or data. The change control system shall address requirements for review, authorization, documentation, notification, and controls on equipment selection, procurement, and maintenance.

(6) Procedures and/or checks to assure the reliability and accuracy of materials control and accountability data and information.

(7) Performance testing conducted by the facility. This portion of the assessment should address the design of performance tests and the results obtained by the testing program since the last assessment.

(8) Procedures for emergency conditions and for periods when materials control and accountability system components are inoperative.

(9) Material control, material access, and material surveillance procedures.

(10) The physical inventory program and reconciliation practices.

(11) Accounting system procedures, capabilities and sensitivities.

(12) Identification of personnel with materials control and accountability responsibilities who should be included in the facility personnel security assurance program, consistent with national security requirements and DOE 5631.6A, PERSONNEL SECURITY ASSURANCE PROGRAM.

(13) Measurement control program.

(14) Tamper-indicating programs.

DOE5633.3B Chapter I, Section 6.f

Reviews shall be conducted prior to start-up of new facilities or operations, and whenever changes are made in facilities, operations, or materials

6.0 SAFEGUARDS AND SECURITY

control and accountability features that might alter the performance of the materials control and accountability system.

DOE5633.3B Chapter I, Section 6.g

In addition to the assessments in subparagraph f above, internal audits of the facility's materials control and accountability function shall be conducted by an organization independent of materials control and accountability to assess compliance with internal plans and procedures. The frequency of these audits shall be approved by the Manager, Operations Office.

RLID5633.3 Section 7.2.d

d. SNM Missing In Transit. RL shall be notified, in accordance with DOE 5000.3B, Section 7.b.- e., and Section 8, when a RL shipment of Category I, II, or III quantities of SNM, or a container from the shipment, does not arrive at the intended destination on schedule, and the location is unknown. The Safeguards and Classification Program Manager is notified and provided the following, as a minimum:

(1) A description of the shipment or container(s)

(2) A description of contents by chemical and physical form, and quantity of material

(3) A statement identifying the classification of the material, if it is unclassified, that is stated

(4) The dollar value of the NM

(5) Routing information including the carrier involved

(6) The expected arrival date

(7) Last known location

(8) Steps which have been or are being taken to locate the missing material, and any additional steps planned

(9) Other possibilities for further investigation.

RLID5633.3 Section 7.3.b

b. Apparent Losses.

(1) The apparent loss or loss of Category I and II quantities of NM shall be investigated and verbally reported, as specified. During day-shift work hours, the Safeguards and Classification Program Manager shall be notified. During other hours, the RL-SAS Duty Officer shall be notified through the Patrol Operations Center
(373-3800).

(2) The initial verbal notification shall be confirmed in writing within 24 hours using the MC&A Fact Sheet Report (see Attachment 1).

(3) A final incident report describing assessment actions, conclusions, and steps taken or planned for corrective action shall be submitted to the Director, Safeguards and Security within 15 working days.

(4) For Categories III and IV quantities of materials, RL shall be notified within 24 hours, and a final report shall be submitted within 15 working days, Section 4.e., using the MC&A Fact Sheet Report.

RLID5633.3 Section 7.2.e

e. Significant Shipper/Receiver (S/R) Differences. When a significant S/R difference is identified, RL shall be notified, in accordance with DOE 5000.3B, Section 7.b.(1) - e., and Section 8, and an investigation shall be initiated which shall include the following action:

(1) Check accounting records to see if element and isotope weights were recorded correctly

6.0 SAFEGUARDS AND SECURITY

(2) Evaluate measurements made for error or biases

(3) Check for appropriate limit of error

(4) Issue a corrected copy of the NM Transaction Report, DOE/NRC Form 741, if an error is discovered

(5) If the element and isotope weights are verified, the contractor should notify the other party involved of the results, and request they evaluate its reported element and isotope weights

(6) Notify RL SAS, in writing, of the results of the investigation within 30 working days after the initial notification of RL

(7) If the investigation does not resolve the difference, the written notification should recommend further action to be taken; i.e., referee samples, S/R accept own values, DOE investigate, etc. RL may direct that other actions be taken by the contractor to resolve the S/R difference.

RLID5633.3 Section 7.3.c

c. Accidental Losses.

(1) Accidental losses of Category I and II quantities of NM shall be reported immediately, during day-shift work hours, to the Safeguards and Classification Program Manager, and during other hours to the RL-SAS Duty Officer through the Patrol Operations Center (373-3800).

(2) The initial notification shall be confirmed in writing within 24 hours using the MC&A Fact Sheet Report (Attachment 1).

(3) For Categories III and IV quantities of materials, RL shall be notified within 48 hours, and a final report shall be submitted within 15 working days using the MC&A Fact Sheet Report.

RLID5633.3 Section 7.3.d

d. Unsecured Facilities.

(1) When unauthorized access to NM may have occurred due to an unsecured facility, RL-SAS and other required personnel shall be notified immediately. During off-shift hours, weekends, and holidays, immediate telephone notification shall be made to the RL-SAS Duty Officer through the Patrol Operations Center (373-3800).

(2) When such an incident occurs, the assigned custodian of the NM involved shall be notified immediately, and a physical inventory of the NM involved shall be taken, based on the requirements stated below. Verification of intact seals is one means for inventory verification of NM.

(a) For Category I and II quantities of SNM, or where there is evidence of forced or unauthorized entry, the custodian shall immediately conduct a physical inventory verification and reconciliation, regardless of the time in which the incident was discovered.

(b) For Category III quantities of SNM (excluding uranium enriched to less than 20 percent U-235), the custodian shall conduct a physical inventory verification and reconciliation on the same day of the discovery. When an incident is discovered off-shift, the verification may be conducted the next calendar day.

(c) For incidents involving reportable quantities of NM (other than SNM), including uranium enriched to less than 20 percent, the physical inventory verification shall be conducted on the same day of the discovery. When an incident occurs off-shift, the verification shall be done on the next regular day shift.

(d) Oral certification of the inventory results shall be made to RL-SAS immediately upon inventory reconciliation. During off-shift hours, weekends, and holidays, the oral notification of inventory results shall be made to the RL-SAS Duty Officer through the Patrol Operations Center (373-3800). Written certification shall be given no later than 72 hours after the inventory reconciliation, unless otherwise directed by RL-SAS. The MC&A Fact Sheet Report may be used (Attachment 1).

6.0 SAFEGUARDS AND SECURITY

6.4.2 Special Nuclear Material Accountability System

DOE5633.3B Chapter II, Section 2, Introduction

ACCOUNTING SYSTEMS. Each facility shall have a system that provides for tracking nuclear material inventories, documenting nuclear material transactions, issuing periodic reports, and assisting with the detection of unauthorized system access, data falsification, and material gains or losses. The accounting system shall provide a complete audit trail on all nuclear material from receipt through disposition. The Generally Accepted Accounting Principles, as promulgated by Financial Standards Accounting Board, shall be used in the design and operations of the nuclear material accounting system unless otherwise directed by DOE directives.

DOE5633.3B Chapter II, Section 2.a

Accounting System Data Base and Procedures. For each facility procedures shall be maintained describing the structure and operation of the nuclear materials accounting system. The procedures shall accurately reflect current nuclear material accounting practices. Specific requirements for accounting procedures include the following:

(1) A description of the inventory data base, including procedures for updating the inventory data and reconciling the inventory data with the results of physical inventories, and a description of the required data elements for each applicable material type.

(2) Identification of the accounting reports and their frequency, distribution and timeliness, consistent with accounting requirements.

(3) Identification of the organizational responsibilities for the management and operation of the accounting system.

(4) Recording, reporting, and submission of data to national database, Nuclear Material Management and Safeguards System, by material type and reporting unit, as specified on page II-19 paragraph 7.

DOE5633.3B Chapter II, Section 2.b

Account Structure.

(1) A facility shall consist of one or more Materials Balance Areas established to identify the location and quantity of nuclear materials in the facility. For each facility, readily retrievable accountability data shall be maintained by Material Balance Area that reflects quantities of nuclear materials on inventory, quantities of nuclear material received and shipped, and other adjustments to inventory.

(2) The Materials Balance Area account structure shall provide the capability to localize inventory differences and provide a system of checks and balances for verifying the accuracy of the accountability data and records.

(3) One individual in each Materials Balance Area shall be designated by management to be responsible for ensuring that materials control and accountability policies are implemented in that Materials Balance Area.

(4) Material types, processes, and functions shall be considered in establishment of Materials Balance Areas. The number of Materials Balance Areas shall be sufficient to identify and localize inventory differences and their causes.

(5) A Materials Balance Area boundary shall not cross a Materials Access Area boundary. Each Materials Balance Area should conform to the single geographical are concept and be an integral operation. If more than one geographical area is included in one Materials Balance Area, all of these areas must be under the administrative control of the same individual, and the activities in these areas must be associated with an integral operation.

DOE5633.3B Chapter II, Section 2.c

Records and Reports.

(1) For each facility, management shall maintain records, submit data, and issue reports as required by page II-19, paragraph 7 and facility procedures. These reports shall accurately describe all nuclear material transactions and inventories. Inventory adjustments shall be identified by Materials Balance Area and shall be reported consistent with requirements of this Order, page II-19, paragraph 7.
(2) Nuclear materials records shall be updated only by authorized personnel, and the records system shall provide an audit trail for all

transactions affecting the nuclear materials database.
(3) The Materials Balance Area records system shall be capable of being updated daily or upon demand for all nuclear materials transactions. (This requirement is for the updating of records based on reports or information; it is not a requirement on how quickly a facility must be able to complete measurements.) In addition, the records system shall be capable of generating book inventory listings for all special nuclear material within 3 hours. For all other nuclear material, the timing for generation of book inventories shall be within 24 hours. Validating the accuracy of the accounting record system shall be conducted according to testing methodology, testing frequency, and record maintenance requirements contained in DOE 5630.16A and applicable Department guidance. Performance requirements for accounting record system accuracy are contained page I-10, paragraph 4.

DOE5633.3B Chapter II, Section 3.a
Periodic Physical Inventories.

(1) Physical Inventories. Inventories shall be based on measured values and, where feasible, measurements or technically justifiable estimates of holdup shall be made so that holdup quantities can be used in determining inventory values or explaining the inventory difference. Process monitoring techniques may be used for material which is undergoing processing and recovery operation but inaccessible for measurements by sampling. Process monitoring, in addition to material control procedures and specific action criteria, subject to the approval of the Manager, Operations Office, should be used routinely to track materials in process until operations permit an accountability measurement.

(2) Conduct of Inventories. For each facility, there shall be documented plans and procedures defining responsibilities for performing inventories and specifying criteria for conducting, verifying, and reconciling inventories of nuclear material. Verification of the presence of items during inventories may be performed on a statistical sampling basis. Sampling plans shall be consistent with the graded safeguards concept. Parameters for statistical sampling plans and inventory stratifications used with statistical sampling plans shall be defined by the facility management and approved by the Manager, Operations Office.

(3) Holdup Inventory. Holdup inventory shall be measured, where feasible, or estimated on the basis of throughput, process data, modeling, engineering estimates, or other technically defensible factors as a regular part of

DOE5633.3B Chapter II, Section 3.b
Special Inventories. At each facility, management shall establish and implement procedures for conducting special inventories as a result of routine disassembly of critical assemblies, changes in custodial responsibilities, missing items, inventory differences exceeding established control limits, abnormal occurrences, or at the request of authorized facility personnel or the cognizant Operations Office.

DOE5633.3B Chapter II, Section 3.d.(1)
At each facility, management shall establish and implement a system for performing measurements as part of a physical inventory. Verification measurements shall be made on special nuclear material items that are not tamper-indicating. Confirmation measurements shall be made on items that are tamper-indicating. Such measurements are intended to detect diversion or theft of material and shall use a statistically-based sampling plan applied in a manner consistent with the graded safeguards concept. Separate sampling plans shall be implemented for verification and confirmation measurements to assure that a sufficient number of non-tamper-indicating items are measured. Parameters for statistical sampling plans and inventory stratifications used with statistical sampling plans shall be defined by facility management and approved by the Manager, Operations Office. The Manager, Operations Office, may establish a material quantity threshold for requiring inventory verification/confirmation measurements. It is recognized that certain materials are not amenable to verification measurements. Such materials shall be documented in the Materials Control and Accountability Plan and, for these materials, confirmatory measurements of two material attributes may be substituted for the verification measurement. Material not amenable to measurement shall be identified as on page II-6, paragraph 4.

DOE5633.3B Chapter II, Section 3.d.(2)
Documented acceptance/rejection criteria for inventory confirmation/ verification measurements shall be established based on valid technical and, where technically feasible, on valid statistical principles. For Category I and II items, acceptance/rejection criteria shall be consistent with performance requirements for confirmation/verification measurements stated in Figure I-4, page I-12. A response plan shall be prepared and implemented for evaluating and resolving all verification/confirmation measurements that fail acceptance criteria. Items that fail the confirmation/verification measurement criteria shall not be processed prior to resolution of the discrepancy. Performance requirements for inventory confirmation/verification measurements are contained on page I-10, paragraph 4.

6.0 SAFEGUARDS AND SECURITY

DOE5633.3B Chapter II, Section 4, Introduction

MEASUREMENTS AND MEASUREMENT CONTROL. At all facilities possessing nuclear material, measurement and measurement control programs shall be implemented. The object of measurement and measurement control is to establish nuclear material values and to assure the quality of the data. Measurements programs used to determine Category I or II inventories of special nuclear material or used to determine a Category I or II special nuclear material throughput over a 6 month period shall address the topics identified in this paragraph and shall be consistent with facility-specific measurement program objectives. For other measurement and measurement control programs (those used only to determine Category III or IV inventories), the scope and content of the programs shall be approved by the Manager, Operations Office. For Category I and II facilities, these programs shall address the topics identified in this paragraph and shall be consistent with facility-specific measurement program objectives.

Materials not amenable to measurement by the site shall be identified in the facility's Material Control and Accountability Plan. Inventory values for these materials shall be based on measured values made at other sites or technically justified estimates. Justification and supporting documentation for these inventory values shall be include as part of the Materials Control and Accountability Plan.

Additional guidance on measurement control is provided in the DOE "Measurement Control Guide," (3-93).

DOE5633.3B Chapter II, Section 4.b

Selection and Qualification of Measurement Methods. The objective is to ensure that measurement methods selected for use are capable of measuring the material in question to the desired levels of precision and accuracy, as approved by the Manager, Operations Office, and consistent with a graded safeguards approach. To this end, each facility's management shall select, qualify, and validate measurement methods capable of providing the desired levels of precision and accuracy. Selection and qualification of a measurement method shall be the responsibility of the facility management. Target values for the accuracy and precision of nuclear material measurements recommended and endorsed by recognized national and international nuclear organizations may be used by contractors and Operations Offices as guidance for desirable levels of accuracy and precision. The Manager, Operations Office, shall review the documentation of this process and shall approve the precision and accuracy goals. Each facility shall have procedures to ensure that only qualified measurement methods are used for accountability purposes.

DOE5633.3B Chapter II, Section 4.c

Training and Qualification of Measurement Personnel. The objective is to assure that the individuals responsible for performing measurements have sufficient knowledge to perform the measurements in an acceptable manner.

(1) Training. Each facility shall have a documented plan for the training of measurement personnel. The plan shall be reviewed annually and updated as necessary to reflect changes in measurement technology and shall specify training, qualification, and requalification requirements for each measurement method.

(2) Qualification. Each facility shall have a documented qualification program that ensures that measurement personnel demonstrate acceptable levels of proficiency before performing measurement, and that measurement personnel are requalified according to requirements in the training plan. For destructive analysis of nuclear material, this proficiency shall be demonstrated, at a minimum, once per day for each method that the individual

DOE5633.3B Chapter II, Section 4.d.(1)

Sampling. The objective of the sampling program is to ensure that the small portion of bulk material taken for measurement is representative of the bulk material. Each facility shall have documented sampling plans for each measurement point used for accountability purposes. The plans shall be based on valid technical and statistical principles and shall take into account material type, measurement requirements, and any special process or operational considerations.

(a) The basis of the sampling plan shall be documented and validated through studies of the materials or items being sampled.

(b) The sampling plan shall specify at a minimum the sampling procedure, number of samples required, size of samples, mixing time and procedure (when applicable), provisions for retaining archive samples, and estimates of variance associated with the sampling method.

6.0 SAFEGUARDS AND SECURITY

DOE5633.3B Chapter II, Section 4.d.(2)

Measurement Methods. For each facility, measurement methods shall be developed, documented, and maintained for all nuclear material on inventory except for those materials not amenable to measurement. These methods shall be written to provide clear direction to the analyst or operator, and shall be validated initially and revalidated whenever changes are made.

(a) In determining inventory values and consistent with the graded safeguards concept, the selection of the measurement methods shall assure that the contribution of the measurement error to the uncertainty of the inventory difference is minimized.
(b) Verification measurements, when used to adjust accountability records, shall have accuracy and precision comparable to, or better than, the original measurement method.
(c) For confirmatory measurements, the measurement method used shall be capable of determining the presence or absence of a specific attribute of the material, consistent with valid acceptance/rejection criteria.
(d) All measurement methods shall be calibrated using Standard Reference Materials, Certified Reference Materials, or secondary standards traceable to the national measurement base, and revalidated as necessary.
(e) Equipment and instrumentation used in performing measurements shall meet precision and accuracy requirements under in-plant conditions.
(f) Documentation of measurement data shall be maintained to provide an audit trail from source data to accounting records.

DOE5633.3B Chapter II, Section 4.e.(1)

Measurement Control Programs. For each facility, measurement control programs shall be developed and implemented for all measurement systems used for accountability purposes. A measurement control program, as referred to herein, shall include at a minimum the following elements:
(a) Scales and Balances Program. All scales and balances used for accountability purposes shall be maintained in good working condition, recalibrated according to an established schedule, and checked for accuracy and linearity on each day that the scale or balance is used for accountability purposes.
(b) Analytical Quality Control. Data from routine measurements shall be analyzed statistically to determine and ensure accuracy and precision of the measurements.
(c) Sampling Variability. The uncertainty associated with each sampling method, or combination of sampling and measurement method, shall be determined and maintained on a current basis.
(d) Physical Measurement Control. The precision and accuracies of volume, temperature, pressure, and density measurements shall be determined and assured.
(e) Instrument Calibration. Instrumentation shall be calibrated using appropriate standards, when available, or at a minimum, measurement values shall be compared with more accurate measurement systems values on a prescribed basis, with the frequency being defined by demonstrated instrument performance.
(f) Reference Materials (Standards). All calibration and working standards used in a measurement control program shall be traceable to the national measurement base through the use of standard reference materials or certified reference materials and shall have smaller uncertainties associated with their reference values than the uncertainties of the measurement method in which they are used. Working standards used in a measurement control program shall be representative of the type and composition of the material being measured when the material matrix affects the measured values. For additional information see "Guidance on Meeting DOE Order Requirements for Traceable Nondestructive Assay Measurements."
(g) Sample Exchange Programs. Each facility's measurement control program shall include participation in appropriate interlaboratory control programs to provide independent verification of internal analytical quality control.
(h) Statistical Controls. For each measurement method used for accountability purposes, control limits shall be calculated and monitored, and documented procedures shall exist to correct out-of-limits conditions. Control limits shall be established at the two sigma level (warning limits) and three sigma level (alarm limits). Control data exceeding the two sigma limits shall be investigated, and, when warranted, timely corrective action shall be taken. Whenever a single data point exceeds the three sigma level, the measurement system in question shall not be used for an accountability measurement until the measurement system has been demonstrated to be within statistical control. For measurement methods relying substantially on operator technique, control limits shall include uncertainties for each analyst/method combination. Statistical control limits shall be monitored to assure that they are consistent with target values agreed to by the facility management and the Manager, Operations Office.
(i) Measurement Method Qualification. Each facility shall have a documented method qualification program that ensures that a measurement method shall demonstrate acceptable performance before being used for performing accountability measurements. For destructive analysis and nondestructive assay of nuclear material, this performance shall be demonstrated, at a minimum, once per day that each method is used. For

nondestructive analysis measurement systems where meeting this requirement is impractical or unnecessary, the control measurement frequency shall be at least one of every five measurements, unless otherwise approved by the Manager, Operations Office.
(j) Measurement Control Procedures. Documented measurement control procedures shall be developed at each facility for all measurement methods used for accountability, and each facility shall have a program to assure that measurement control procedures are followed.

DOE5633.3B Chapter II, Section 4.e.(2)

Statistical Programs. Each facility shall have a documented program for the statistical evaluation of measurement data for determining control limits, calibration limits, and precision and accuracy levels for each measurement system used for accountability. The objective is to ensure the quality of measurement and measurement control data and to provide estimates of uncertainty on inventory and inventory control statements. The program, at a minimum, shall contain the following elements:

(a) Valid statistical techniques to determine the total random error and the measurement biases generated for each measurement system or sampling/measurement system, and to determine control limits, rejection limits, and outlier criteria.

(b) A valid statistical technique to develop sampling plans for inventory and measurement of nuclear material.

(c) Analyses of measurement control data and reporting to the responsible organization at specified times and frequencies.

(d) Documentation of all major assumptions made in each data evaluation process.

DOE5633.3B Chapter II, Section 6.b.(1)

Each facility shall have a documented program for evaluating all special nuclear material inventory differences, including those involving missing items. Programs for evaluation of inventory differences for other nuclear materials may be established at the option of the Manager, Operations Office. Procedures shall be provided for establishing control limits and requiring investigation when those limits are exceeded. Warning limits will be set at the 95 percent confidence level. Alarm limits will be set at the 99 percent confidence level. All inventory differences exceeding warning or alarm limits shall be reported in accordance with DOE 5000.3B and page I-13, paragraph 5. Assessments of inventory differences shall include statistical tests (e.g., tests of trends and biases), and shall be applied, as appropriate, to both total inventory difference and actual inventory difference on an individual and cumulative basis for each processing Materials Balance Area.

DOE5633.3B Chapter II, Section 6.b.(2)

Procedures for establishing control limits for inventory differences shall be based on variance propagation using current data. The data should reflect operating conditions for the material balance period of the inventory. Alternatively, other statistically-valid techniques may be used but must be justified on the basis of factors such as limited data, low transfer rates, categories, and major process variations. The methodology shall be approved by the cognizant Manager, Operations Office. Historical inventory difference data shall be evaluated for comparison with the statistically based limits, where applicable. Where the propagated or otherwise statistically based methods do not yield control limits consistent with historical data, efforts shall be made to resolve the discrepancies between the two.

DOE5633.3B Chapter II, Section 6.b.(3)

Each facility shall have documented procedures for responding to and reporting missing items and inventory differences in excess of control limits. The reporting and investigation of inventory differences shall be consistent with the requirements specified on page I-13, paragraph 5.

DOE5633.3B Chapter II, Section 6.c.(1)

Each facility's management shall establish a documented program for evaluating all inventory adjustments entered in the accounting records. The program shall include written procedures including equations for applying radioactive decay and fission/transmutation adjustments. A program for holdup adjustments must be justified on the basis of measurements or other factors. Procedures shall be outlined for the statistical review of inventory adjustments using techniques such as tests of trends, biases, and correlation.

DOE5633.3B Chapter II, Section 6.c.(2)

Procedures shall be implemented to assure that all inventory adjustments are supported by measured values or other technically defensible bases. The program shall include procedures for measuring/monitoring environmental waste such as stack effluents and liquid waste streams as required by DOE 5400.1, GENERAL ENVIRONMENTAL PROTECTION PROGRAM.

DOE5633.3B Chapter II, Section 6.c.(3)

Procedures shall be established for reporting reviews of inventory adjustments, including abnormal situations, to the Manager, Operations Office.

6.0 SAFEGUARDS AND SECURITY

DOE5633.3B Chapter II, Section 7.a

Forms. Those forms identified and described in the DOE 5633.3B GUIDE OF IMPLEMENTATION INSTRUCTIONS FOR NUCLEAR MATERIALS MANAGEMENT AND SAFEGUARDS SYSTEM REPORTING AND DATA SUBMISSION (or an equivalent form approved by the cognizant field element) shall be used for the documentation and reporting of nuclear materials transactions, material balances, and inventories in accordance with the instructions provided. A computer-generated or other approved equivalent must contain all information necessary for proper documentation and reporting of nuclear materials transactions, material balances, and inventories, as appropriate. The forms may be obtained through the DOE Oak Ridge Operations Office, Material Control and Accountability Branch.

DOE5633.3B Chapter II, Section 7.b.(3)

Material Balance Report. Nuclear material balances shall be documented and reported in accordance with the instructions provided.

(a) Material balance reports shall be submitted on or in the format of DOE/NRC F 742, "Material Balance Report."

(b) A single material balance report shall be prepared for each material type to document the beginning and ending inventories, and all receipts and removals of nuclear material relevant to the reporting identification symbol being reported on by each facility. Inventory and transfer data shall be reported for all nuclear material, regardless of whether the material is held pursuant to a DOE contract, under private ownership, or under the provisions of 42 U.S.C. parts 2073, 2074, 2093, or 2094 (as amended).

(c) Material types, elements, and isotopes to be reported, and their respective reporting units, shall be as specified in Figure I-1, page I-2. Each quantity shown on DOE/NRC F 742 shall be rounded to the proper whole reporting unit for the material type.

(d) Adjustments, amendments, or corrections to reports shall be made according to the instructions provided.

(e) Radioactive decay shall be reported on material balance reports on a quarterly basis when the decay has reached accountable quantities or at a more frequent reporting interval if required by the cognizant Operations Office.

RLID5633.3 Section 6.e.(2)

(2) Develop and maintain an accountability records system, as required by DOE 5633.3B, which reflect NM receipts, removals, and inventories by material type by MBA. Maintain historical records of NM transactions, inventory differences, and inventories.

RLID5633.3 Section 7.1.d

d. Training and Qualification of MC&A Personnel. Each contractor shall have a training program for personnel performing MC&A functions which meets the requirements of DOE 5630.15. In addition, the training plan shall be a component of the MCAP, which addresses such subjects as who requires training, type of training, frequency of training, and conditions requiring training. The basis for qualifying and maintaining qualification for MC&A personnel shall be documented in the MCAP.

RLID5633.3 Section 7.2.a.(2)(3)(4)

(2) Inventory Reconciliation. Contractors shall reconcile the results of all required physical inventories to official accounting records (book inventory). The reconciliation shall be done as soon as possible, but not later than 15 calendar days following receipt of all inventory information, measurement data, and/or sample analysis. Resulting inventory differences, if any, shall be applied to the book inventory and compared with applicable control limits as soon as possible thereafter, but not to exceed 15 days following reconciliation.

(3) RL Form 430. The RL Form 430 or its equivalent shall be signed by all witnesses no later than 15 days after reconciliation has been completed.

(4) Facility Restart. For Category I or II MBAs, NM movements shall not resume following completion of an inventory, until the inventory has been reconciled, and a preliminary determination has shown that the inventory difference does not exceed the warning limit.

6.0 SAFEGUARDS AND SECURITY

6.4.3 Material Control System

DOE5633.3B Chapter III, Section 2.a

Materials Access. Each facility shall have a documented program to ensure that only properly authorized personnel have access to nuclear materials. This program shall address procedures and mechanisms to detect/respond to access by unauthorized personnel. In order to minimize the potential for unauthorized access to nuclear material, the amount of material in use shall be limited to that necessary for operational requirements, and excess material shall be stored in repositories or kept in enclosures designed to assure that access will be limited to authorized individuals. See DOE 5632.1C for additional access control and storage requirements for special nuclear material and DOE M 5632.1C-1, MANUAL FOR PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS, for access authorization requirements for special nuclear categories.

DOE5633.3B Chapter III, Section 2.b

Data Access. Each facility shall have a graded program to assure that only authorized persons have the ability to enter, change, or access material control and accountability data and information.

DOE5633.3B Chapter III, Section 2.c

Equipment Access. Each facility shall have a graded program to control access to data-generating and other equipment used in material control activities, thereby assisting in providing assurance of the integrity of equipment and data used for material control. Such equipment includes measurement equipment, data recording devices, and tamper-indicating devices. An access control program comparable to that required for classified computer systems may be required if such controls are necessary to assure the integrity of the data system.

DOE5633.3B Chapter III, Section 2.d

Other Considerations. Access controls similar to those described in paragraphs 2b and c above shall be designed to protect against data/equipment falsification or manipulation and shall detect unauthorized activities during emergency or other unusual conditions.

DOE5633.3B Chapter III, Section 3, Introduction

MATERIAL SURVEILLANCE. Each facility's management shall establish a graded surveillance program for monitoring nuclear materials and detecting unauthorized activities or anomalous conditions and for reporting material and facility status. The objective is the detection and assessment of conditions that may adversely affect safeguards, e.g., to detect anomalies and to report alarm conditions. The surveillance program shall address both normal and emergency conditions, and shall provide for periodic testing. Testing for material surveillance systems and procedures shall be planned and documented in accordance with DOE 5630.16A. Performance requirements for material surveillance of Category I and II quantities of special nuclear material are contained in page I-10, paragraph 4.

DOE5633.3B Chapter III, Section 3.b, Introduction

Material Surveillance Programs. Surveillance procedures shall describe the methodologies and operational/control points on which the program is based and shall provide for investigation, notification, and reporting of anomalies. Alternatives to the material surveillance requirements specified below may be approved in accordance with DOE 5630.11B for facilities that rely primarily on other materials control and accountability and/or security measures.

DOE5633.3B Chapter III, Section 3.b.(1)

Category I and II. The material surveillance program for Category I and II quantities of special nuclear material shall assure that materials are in authorized locations and shall detect unauthorized material flows and transfers. Evaluations of Category I locations shall be performed to determine system capabilities to assess material losses from Materials Access Area and Protected Area boundaries. Evaluations of Category II locations shall be performed to determine system capabilities to assess material losses from the Protected Area boundary. Material surveillance procedures for all areas having Category I or II quantities of special nuclear material shall include the following:

(a) Only appropriately authorized personnel and knowledgeable personnel (i.e., individuals who are capable of detecting incorrect or unauthorized actions) shall be assigned responsibility for surveillance of special nuclear material.

(b) Controls shall be sufficient to ensure that one individual cannot gain access to a secure storage area.

(c) Procedures to ensure constant surveillance of all persons in secure storage areas (e.g., two-person rule or equivalent surveillance procedures) shall be in effect at any time the storage area is not locked and protected by an active alarm system.

6.0 SAFEGUARDS AND SECURITY

(d) Surveillance shall be sufficient to ensure that unauthorized or unaccompanied authorized personnel cannot enter the storage area undetected when the door is unlocked or open.

(e) When two persons are assigned responsibility for maintaining direct control of the item(s) outside an alarmed storage area within an Materials Access Area or Protected Area, either the two authorized persons shall be physically located such that they have an unobstructed view of the item(s) and can positively detect unauthorized or incorrect procedures, or there shall be a system of hardware, procedures, and administrative controls sufficient to ensure no unauthorized accumulation of a Category I quantity without timely detection.

(f) Special nuclear material in use or process shall be under material surveillance procedures, under alarm protection, or with the approval of responsible Heads of Field Elements, protected by alternative means which can be demonstrated to provide equivalent protection.

DOE5633.3B Chapter III, Section 3.b.(2)

Category III. The material surveillance program for Category III quantities shall assure that when materials are not in locked storage, they are attended, are in authorized locations, and are not accessed by unauthorized persons.

DOE5633.3B Chapter III, Section 3.b.(3)

Category IV. The material surveillance program for Category IV quantities shall be site-specific and approved by the Manager, Operations Office.

DOE5633.3B Chapter III, Section 4.a

Materials Access Area and Protected Area. The facility shall have controls to assure that Category I quantities of special nuclear material are used, processed or stored only within an Materials Access Area contained in a Protected Area and that Category II quantities of special nuclear material are used, processed, or stored only within a Protected Area. The containment program shall:

(1) Be formally documented;

(2) Comply with the graded safeguards concept;

(3) Identify authorized activities and locations for nuclear materials;

(4) Identify mechanisms used to detect unauthorized activities;

(5) Identify material types, forms, and amounts authorized to be removed from

DOE5633.3B Chapter III, Section 4.b

Materials Balance Area. Each facility shall have controls to ensure that nuclear materials used, processed, or stored within an Materials Balance Area are controlled in accordance with the graded safeguards concept. Additionally, these controls shall ensure that materials are removed only via authorized pathways/portals and are subject to transfer and verification procedures as identified on page II-11, paragraph 5. The controls for Materials Balance Areas shall:

(1) Be formally documented;

(2) Identify geographical boundaries and functions of the Materials Balance Areas;

(3) Identify material types, forms, and quantities permitted in each Materials Balance Area;

(4) Describe the administrative controls for each Materials Balance Area;

(5) Define custodial responsibilities for nuclear materials contained within an Materials Balance Area;

6.0 SAFEGUARDS AND SECURITY

DOE5633.3B Chapter III, Section 4.c

Storage Repositories. The facility shall have controls for nuclear materials held in storage repositories consistent with the graded safeguards concept. The control for storage repositories are contained in DOE M 5632.1C-1.

DOE5633.3B Chapter III, Section 4.d

Processing Areas. The facility shall have control for nuclear materials being used or stored in processing areas. The controls for in-process areas shall:

(1) Be formally documented;

(2) Describe activities and locations for storing material;

(3) Identify components used to detect unauthorized activities or conditions;

(4) Include procedures for moving material into or out of the processing area;

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DOE5633.3B Chapter III, Section 5, Introduction

Detection/Assessment. Each facility shall have the capability to detect and assess the unauthorized removal of nuclear materials, consistent with the graded safeguards concept. The system shall be interfaced with the facility's physical protection and other organizational systems, as appropriate, and shall be able to detect removal of special nuclear material from its authorized location (theft/diversion/errors) and provide

DOE5633.3B Chapter III, Section 5.a

Tamper-Indicating Devices. The reliance on tamper-indicating devices as a safeguards measure is directly dependent on the environment in which the tamper-indicating device resides and the material being tamper-safed. Each facility shall have a documented program, administered by the materials control and accountability organization, for control of tamper-indicating devices and to assure that tamper-indicating devices are used to the extent possible to detect violations of container integrity. DOE-wide standardized tamper-indicating devices should be used when available through DOE standardized procurement (see DOE 5630.17, SAFEGUARDS AND SECURITY (S&S) STANDARDIZATION PROGRAM). Testing of tamper-indicating device integrity, location, and application and the tamper-indicating device record system shall be conducted according to testing methodology, testing frequency, and record maintenance requirements contained in DOE 5630.16A and applicable Departmental directives and guidance. Performance requirements for tamper-indicating devices are contained on page I-10, paragraph 4, of this Order. The "Safeguards Seal Reference Manual," issued by Office of Safeguards and Security, can facilitate in the selection, application, and verification of tamper-indicating devices. The tamper-indicating device control program shall specify, as a minimum, the following elements:

(1) Acquisition/procurement/destruction;

(2) Types of tamper-indicating devices utilized;

(3) Assurance of unique tamper-indicating devices identification;

DOE5633.3B Chapter III, Section 5.b

Portal Monitoring. The minimum portal monitoring requirements are in DOE 5632.1C. In addition to those requirements, the detection level of the monitors shall be based upon detection of the typical special nuclear material product in the area and the credible number of removals associated with theft of the Category I quantity of material. All detectors and related calibration standards shall be maintained and controlled to ensure that portal monitors are capable of meeting detection requirements. Periodic performance testing of portal monitors shall be conducted in accordance with page I-10, paragraph 4b. Planning and documentation of performance testing shall meet the requirements of DOE 5630.16A. Performance requirements for portal monitors (both special nuclear material and metal) are contained on page I-10, paragraph 4. Controls shall be established to prevent unauthorized access to portal monitor instrumentation and cabling. A written response plan shall be prepared and implemented to provide evaluation and resolution of all alarm conditions, including requirements for notification in accordance with DOE 5000.3B (and the requirements contained on page I-13, paragraph 5,) in the event of unresolved alarms of malevolent actions. Controls shall be established to ensure detection capabilities during emergency conditions.

6.0 SAFEGUARDS AND SECURITY

DOE5633.3B Chapter III, Section 5.c.(2)

A response plan for evaluating and resolving situations involving any discharge exceeding facility-specific limits approved by the Manager, Operations Office, shall be established and implemented. The plan shall provide for reporting in accordance with DOE 5000.3B and the requirements contained on page I-13, paragraph 5 of this Order, if the situation is not satisfactorily resolved or if there is an indication of malevolent action.

DOE5633.3B Chapter III, Section 5.d

Daily Administrative Checks. A facility-specific daily administrative checks program shall be implemented for each Category I Materials Balance Area (or multiple Materials Balance Areas where rollup to a Category I quantity of special nuclear material is credible). The scope and extent of the checks shall be determined and approved by the Operations Office based upon recognized vulnerabilities. The administrative checks program shall specify the detection objectives, performance procedures, documentation requirements, and response actions.

DOE5633.3B Chapter III, Section 5.e

Other Detection/Assessment Mechanisms. For each facility, systems capable of detecting and/or assessing special nuclear material removals shall be established consistent with the losses detection elements evaluation requirements on page I-10, paragraph 4. Detection/assessment mechanisms may be based on item identification, number of items, verification of intact tamper-indicating devices, confirmation that no access has occurred, process monitoring, near-real time accountability, control procedures for use and movement of material, or any other approved technique for identifying anomalies. These monitoring and control systems shall provide sufficient information to correctly assess the alarm, localize the removal, and estimate the quantity and form of the diverted or stolen material.

RLID5633.3 Section 6.e.(12)

(12) Establish "authorized locations" for the purpose of defining diversion.

6.6.5 Communications Security

DOE5632.1C Preamble, Section 7.e.(8)

Communications.

(a) Voice communications systems used for security purposes shall be reliable and provide intelligible voice communications for all applicable modes of operation.

(b) Security system data transmission lines shall be protected in a graded manner from substitution and tampering.

6.9 Evaluation of Radiological and Toxicological and Sabotage Consequences

DOE5630.11B Section 9.c

Risk Analysis. The acceptance of some level of risk is inherent in any activity. The determination of the appropriate level of protection shall take into account the nature of the threat, the vulnerability of the potential target, and the potential consequences of an adversarial act. A rational and responsible balance will be obtained through the planning and execution of a comprehensive safeguards and security program. Specific site safeguards and security programs shall be based on vulnerability/risk analyses. These programs shall be designed to provide a high degree of assurance that threats are deterred, denied, contained, mitigated, or neutralized, as appropriate. Risk associated with safeguards and security vulnerabilities should be reduced even where not mandated by specific requirements, when such reduction is consistent with the Department's mission and when supported by appropriate cost/benefit analyses.

7.0 ENGINEERING PROGRAM

7.0 ENGINEERING PROGRAM

7.1.1 Program Policy and Procedures

DOE5480.19 Attachment I, Chapter VIII, Section C.9

Temporary Modification Control

Administrative control systems should be established for installation of temporary modifications such as electrical jumpers, lifted leads, pulled circuit boards, disabled annunciators/alarms, mechanical jumpers/bypasses, temporary setpoint changes, installed or removed block flanges, disabled relief or safety valves, installed or removed filters or strainers, plugged floor drains, and temporary pipe supports. Prior to modification, these controls should provide for communicating the installation of temporary modifications to the design authority to allow for technical oversight and an evaluation of the impact on current design activities, and approval of the design modification. These control systems should make provisions for safety reviews, installation approval, independent verification of correct installation and removal, documentation of the modification, update of operating procedures and documents, training, marking of installed modifications, and periodic audits of outstanding modifications.

DOE6430.1A Section 0101-1

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.

7.1.4 Planning

DOE4700.1 Chapter III.B.2.c.(1)

Planning.

(a) Technical Objectives. Technical objectives for each project should be established so that relationships among project needs, urgency, risks, and value can be established.

(b) Engineering Integration. Coordination should be provided for among the engineering disciplines and specialties, and their integration into the design process should be provided for as early as possible.

DOE4700.1 Chapter III.B.3.c.(2)

Planning. During test and evaluation planning, the following data, as appropriate, should be established for each parameter:

(a) Specification;

(b) A time-phased planned value profile that plots the expected growth over time of the parameter being tested, along with a tolerance band, the

boundaries of which indicate the range within which the value is expected to be achieved within current budget and schedule, including usual forecast error;

(c) Other events significantly related to the achievement of the planned value; and

(d) Test Conditions.

DOE4700.1 Chapter III.C.4.c.

Duration. Planning for configuration management should start with preparation of the project plan and continue as part of the project planning process. Configuration management continues throughout the product's life cycle until it is removed from inventory.

DOE6430.1A Division 1, Section 0110-13.2

Access Control and Security Areas.

Controls shall be established to prevent unauthorized access to security areas or removal of security interests. In general, the following apply

o A minimum number of entrances shall be provided for security areas. However, exits from security areas shall be adequate to satisfy the requirements of NFPA 101. Some exits may be provided for emergency use only.

o Entrances to and exits from security areas shall be equipped with doors, gates, rails, or other movable barriers that will direct and control the movement of personnel or vehicles through designated portals.

o Door locks and latches used on security area perimeters shall comply with NFPA 101.

A security area denotes a physically defined space containing a Departmental security interest and subject to physical protection and access controls. Security areas shall be established when the nature, size, revealing characteristics, sensitivity, or importance of the classified matter or associated security interests is such that access to them cannot be effectively controlled by other internal measures. The type of security area established depends on the nature of the security interests to be protected, with the following types required for the protection of the listed security interests:

o Property Protection Area for protection of DOE property, located at property protection facilities

o Limited Area for protection of classified matter where guards, security inspectors, or other internal controls can prevent access to classified matter by unauthorized persons

o Exclusion Area for protection of classified matter where mere access to the area would result in access to classified matter

o Protected Area to control Category I and II quantities of special nuclear material

o Material Access Area within a protected area to control access to areas containing Category I quantities of special nuclear material

o Vital Area within a protected area for protection of vital equipment

0110-13.2.2 Property Protection Area Requirements

Security areas normally do not need to be established for offices of consultants or other individuals, small laboratories, or other facilities with limited scope and volume of work. However, adequate security must be in place to preclude unauthorized access.

Verification of the identity of persons authorized access to a limited security area shall be accomplished at the area entrance.

0110-13-2.3 Limited-Area Requirements

7.0 ENGINEERING PROGRAM

Limited-area requirements are as follows:

o Clearly defined physical barriers shall be utilized to control, impede, or deny access, and shall effectively direct the flow of personnel and vehicles through designated portals, and allow effective searches. Permanent barriers shall be used to enclose security areas except during construction or transient activities, when temporary barriers may be erected.

o A means shall be provided to detect unauthorized intrusion by use of alarm systems, random patrols, or visual surveillance.

o Adequate protective illumination shall be provided to permit or assist in detection and assessment of adversaries, reveal unauthorized persons, and, at pedestrian and vehicular entrances, to permit examination of credentials and vehicles. See Section 0283-7, Lighting.

o The protection program shall include suitable means to assess alarms and/or activities of adversaries.

o Measures shall be in place to prevent unauthorized visual or aural access to classified matter as required by DOE 5636.3A.

0110-13.2.4 Exclusion Area Requirements

An exclusion area must meet all the requirements for a limited area, except that when the exclusion area is located within a larger limited area, additional trespass signs are not required, additional inspections or searches need not be performed, and an unattended access control system may be used.

7.1.5 Scheduling

DOE4700.1 Chapter III.B.3.d.

The technical test planning function defines the detailed work requirements and forms the basis for scheduling of task elements, allocation and costing of resources, assignments of authority and responsibility, and the integration of all technical aspects of the project. On contracts subject to the cost and schedule control systems criteria, the test and evaluation planning function is carried out to prescribed work breakdown structure levels as part of compliance.

DOE4700.1 Chapter V.C.2.h.(1)(a)

Considerations Pertaining to Performance Time of Contractors and Effects on Cost. To the extent possible, schedules for engineering, procurement, and construction services shall be established concurrently to assure assignment of adequate time for performance and to properly coordinate the accomplishment of the services. Construction completion of project elements shall satisfy operating requirements, including time for tests and adjustments prior to operation. If required completion dates do not permit normal performance periods, the available time must be allocated to achieve maximum overall economy, based on a careful determination of the feasibility and cost of performance of each service in less than normal time (i.e., with premium time). Sometimes the total time available may not, by any reasonable allocation, allow completion of all design prior to starting construction. Under such conditions, the design shall be scheduled so that logically separable portions of the work, such as sitework, foundations, superstructure, mechanical, and equipment installation can be awarded as separate contracts, bearing in mind that for maximum effectiveness a contractor should have, subject to security limitations, full control of the area in which he is working. However, it may be necessary to perform both engineering and construction on a cost-plus-fixed-fee basis so that both can proceed concurrently. Where plans involve use of more than one fixed-price contract for construction, special care should be taken to assure that the plans and specifications clearly and completely define the scope of work to be accomplished under each contract. Sequential fixed-price contracts should be scheduled to permit orderly progress and timely completion.

7.1.6 Cost Estimating

DOE4700.1 Chapter II.D.1.b.

When the estimate is completed, uncertainties, limiting assumptions, and constraints identified by the estimator must be understandable.

DOE4700.1 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.

7.0 ENGINEERING PROGRAM

DOE4700.1 Chapter II.D.4.a.(1)[1]

The general requirements for each type of cost estimate are as follows: Planning/Feasibility Study Estimate.

DOE4700.1 Chapter II.D.4.a.(1)[2]

The basis for the cost estimate shall comprise a description of the project's purpose, general design criteria, significant features and components, proposed methods of accomplishment, proposed construction schedule, research and development requirements, and any other pertinent cost experiences.

DOE4700.1 Chapter II.D.4.a.(2)[1]

The general requirements for each type of cost estimate are as follows:
Budget or Conceptual Design Estimate.

DOE4700.1 Chapter II.D.4.a.(2)[2]

These cost estimates shall be based on all the detailed requirements in the conceptual design report (CDR) such as the design parameters, ... specifications and standards.

DOE4700.1 Chapter II.D.4.a.(2)[3]

Quality assurance requirements, space requirements, research and development requirements, methods of performance, operations interfaces, safety requirements, and so forth, should be considered.

DOE4700.1 Chapter II.D.4.a.(3)[1]

The general requirements for each type of cost estimate are as follows:
Title I Design Estimates.

DOE4700.1 Chapter II.D.4.a.(3)[2]

The basis for these cost estimates shall include the CDR estimate basis, plus all the refinements developed during the course of producing the Title I engineering package.

DOE4700.1 Chapter II.D.4.a.(3)[3]

This includes all drawings, outline specifications, data sheets, bills of material, schedule refinements, definitions of scope, methods of performance, and changes in codes, standards, and specifications.

DOE4700.1 Chapter II.D.4.a.(4)[1]

The general requirements for each type of cost estimate are as follows:
Title II Design Estimates.

DOE4700.1 Chapter II.D.4.a.(4)[2]

The basis for these cost estimates shall include all the approved engineering data, methods of performance, final project definition and parameters, project schedule, and final exact detailed requirements.

DOE4700.1 Chapter II.D.4.a.(4)[3]

The statement of "basis" shall include a complete list of all engineering data used; (i.e., drawing data sheets, specifications, bills of material, job instructions, proposed schedules, and so forth).

DOE4700.1 Chapter II.D.4.a.(5)[1]

The general requirements for each type of cost estimate are as follows:
Government or Engineer's Estimate.

DOE4700.1 Chapter II.D.4.a.(5)[2]

Since this estimate is simply a refinement of a Title II design estimate, the basis used to make adjustments or refinements shall be listed and made a part of the file.

DOE4700.1 Chapter II.D.4.a.(6)[1]

The general requirements for each type of cost estimate are as follows:
Current Working Estimates.

7.0 ENGINEERING PROGRAM

DOE4700.1 Chapter II.D.4.a.(6)[2]

The basis for these cost estimates shall carefully define the purpose and scope of the estimate along with a complete list of all the considerations used to develop the estimate for actual costs to date and for data used to complete the projections.

DOE4700.1 Chapter II.D.5.d.[1]

A contingency analysis shall be performed on all project cost estimates.

DOE4700.1 Chapter II.D.5.d.[2]

The statement should simply indicate what rationale or thought process the estimator used to reach the conclusions.

DOE4700.1 Chapter II.D.5.d.[4]

For more complex, better detailed, or more expensive projects, individual cost elements or work breakdown structure elements should be evaluated and documented individually.

DOE4700.1 Chapter V.A.2.f. [1]

Cost estimates should always be fully documented and contain the type of estimate, reference year for the dollar figures utilized and date of the estimate.

DOE4700.1 Chapter V.A.2.f. [2]

Heads of Field Elements shall assure that contingency allowances included in estimates are developed utilizing an appropriate contingency analysis procedure for the project being estimated.

DOE4700.1 Chapter V.A.2.f. [3]

The estimate documentation shall include the details on the contingency allowance development.

DOE4700.1 Chapter V.A.2.f.(1)(a) [1]

Planning estimates are developed for each project at the time of project identification.

DOE4700.1 Chapter V.A.2.f.(1)(b) [2]

These estimates should be based on a completed conceptual design and should also be well documented since they must be justified.

DOE4700.1 Chapter V.A.2.f.(1)(c) [1]

Title I design estimates are prepared upon completion of Title I design.

DOE4700.1 Chapter V.A.2.f.(1)(c) [3]

A guideline for contingency allowance during this stage could be from 5 to 25 percent of the construction costs.

DOE4700.1 Chapter V.A.2.f.(1)(d) [1]

Title II design estimates are developed for each project by the designer as part of the Title II design requirements.

DOE4700.1 Chapter V.A.2.f.(1)(e) [1]

Government estimates are used to determine the reasonableness of competitive bids received in connection with sealed bids construction contracts, and serve as a control in evaluating cost and pricing data in negotiated contracts.

DOE4700.1 Chapter V.A.2.f.(1)(e) [2]

Normally, the Title II design estimate prepared by the designer, after being reviewed and approved by the Government, is the basis for the Government estimate. However, the services of an operating contractor, architect-engineer, cost plus fixed-fee construction contractor (with respect to subcontracts) or construction manager may be used as appropriate to prepare, review, or revise the Government estimate prior to Government approval.

DOE4700.1 Chapter V.A.2.f.(1)(e)1 [1]

Government estimates shall be prepared for all construction and architect-engineer contracts estimated at $25,000 and above.

DOE4700.1 Chapter V.A.2.f.(1)(e)1 [2]

Such estimates may be revised when inaccuracies or inconsistencies are revealed during technical evaluation and/or negotiations.

7.0 ENGINEERING PROGRAM

DOE4700.1 Chapter V.A.2.f.(1)(e)2a [1]

Government estimates for fixed-price construction contracts and modifications thereto shall be based on approved Title II working drawings and specifications.

DOE4700.1 Chapter V.A.2.f.(1)(e)2a [2]

These estimates shall be prepared in accordance with the practices of the construction industry and in the same careful manner as if the Government were bidding in competition with private contractors.

DOE4700.1 Chapter V.A.2.f.(1)(e)2b(1)

Government estimates shall be summarized to conform with bid items but shall include the following items, as backup, listed separately: Separate estimates for alternates set forth in the bidding documents;

DOE4700.1 Chapter V.A.2.f.(1)(e)2b(2)

Government estimates shall be summarized to conform with bid items but shall include the following items, as backup, listed separately: A breakdown indicating quantities and unit costs for labor, materials, and equipment entering into the work;

DOE4700.1 Chapter V.A.2.f.(1)(e)2b(3)

Government estimates shall be summarized to conform with bid items but shall include the following items, as backup, listed separately: Estimates for mobilization and demobilization;

DOE4700.1 Chapter V.A.2.f.(1)(e)2b(4)

Government estimates shall be summarized to conform with bid items but shall include the following items, as backup, listed separately: Allowance for contractor's overhead and profit, including the cost of such items as sales tax, insurance, and bonds.

DOE4700.1 Chapter V.A.2.f.(1)(e)2e [1]

Government estimates for formally advertised or competitive proposal fixed price construction contracts shall not be changed after the opening of bids or proposals unless careful reexamination indicates a definite error.

DOE4700.1 Chapter V.A.2.f.(1)(e)2e [2]

In the event of an estimate is changed under such circumstances, detailed reasons for the revision shall be documented.

DOE4700.1 Chapter V.A.2.f.(1)(f) [1]

Current working estimates are developed periodically during the life of a project for the primary purpose of determining that the project can be completed within the funds authorized.

DOE4700.1 Chapter V.A.2.f.(2) [1]

Included in all cost estimates should be a contingency fund comprised of costs which may result from incomplete design, changes due to unforeseen, uncertain, and/or unpredictable conditions (e.g., construction work disturbances due to operations), and expected costs/savings associated with projected market conditions.

7.1.10 Construction Inspection

DOE4700.1 Chapter V.C.3.c.(1)

The organization or project manager may elect to have inspection services performed by the architect-engineer construction manager, or with in-house personnel. Inspection services shall not be performed by the construction contractor, and special conditions apply to the performance of inspection services by the architect-engineer.

7.2 Design

DOE6430.1A Section 0140[09]

Deviations from specified standards shall be identified and procedures established to ensure their control.

7.2.1 Design Process

7.0 ENGINEERING PROGRAM

DOE4700.1 Chapter V.C.2.a.

Design Objectives. Design objectives shall be:

(1) Achieving minimum construction costs consistent with programmatic, environmental, security, and safety requirements;

(2) Achieving technical adequacy;

(3) Achieving optimum economy in operation and maintenance; and

(4) Assuring that appropriate consideration is given to the expected period of use; quality construction practices; energy conservation, decontamination, decommissioning, and quality assurance requirements; and the appearance of completed facilities.

7.2.1.1 General Design Process Controls

DOE4700.1 Chapter III.B.2.c.(4)(a)

Controls.
Work Breakdown Structure Compatibility. The technical tasks to be performed are identified as work breakdown structure elements. System and technical requirements also should be consistent and traceable throughout the work breakdown structure so that the impact of cost, schedule, and technical problems can be promptly determined and accurately evaluated.

DOE4700.1 Chapter III.C.2.a

Configuration Management
The configuration management plan establishes technical interface requirements and procedures, establishes a configuration control board, and indicates approval levels for changes. Attachment III-5 outlines the configuration management process, and Attachment III-6 outlines a configuration management plan.

DOE4700.1 Chapter III.C.2.b

Configuration Control.
Documentation may be changed as agreed to by DOE and as described in the contractor's configuration management plan. Contractor proposed changes should be screened by the contractor to determine whether DOE approval is required prior to implementation. If prior approval is required, the change shall be formally proposed to the project office prior to implementation. The project office will approve or disapprove the change or endorse and forward to the next higher board if the change exceeds the project office approval authority. If prior DOE approval is not required, the contractor may implement the change. The contractor's control system should:

(a) Permit identification of the status of a proposed change;
(b) Permit identification of the status of change implementation; and
(c) Provide an audit trail of change history.

DOE4700.1 Chapter V.C.2.a.

Design Objectives. Design objectives shall be:

(1) Achieving minimum construction costs consistent with programmatic, environmental, security, and safety requirements;

(2) Achieving technical adequacy;

(3) Achieving optimum economy in operation and maintenance; and

(4) Assuring that appropriate consideration is given to the expected period of use; quality construction practices; energy conservation, decontamination, decommissioning, and quality assurance requirements; and the appearance of completed facilities.

DOE4700.1 Chapter V.C.2.b.

Design Methods.
Considerable improvements in the method of design accomplishment are emerging with the use of computer-aided design. Field organizations

7.0 ENGINEERING PROGRAM

shall utilize the advantages of computer-aided design when appropriate.

7.2.1.2 Design Analysis

DOE4700.1 Chapter III.B.2.c.(5)

Analysis.

(a) Engineering Decision Studies. Engineering decisions regarding design options should reflect analysis of system cost effectiveness based on performance and other technical parameters, project schedule, resource constraints, risk assessments, and life cycle cost factors. Significant engineering decisions should be traceable to the system engineering analysis on which they were based.

(b) Life Cycle Cost Estimates. These cost estimates include acquisition and ownership costs including operation, maintenance and disposition costs.

7.2.2 Design Criteria

DOE5480.11 Section 9.j(1)(d)

Maintenance, Decontamination, and Decommissioning. Ease of maintenance and decontamination and decommissioning is to be considered in facility design and selection of materials.

DOE6430.1A Section 0140[08]

Wherever possible, design shall reflect experience gained on similar projects or similar types of construction. Provisions shall be made for review and checking design calculations, drawings, and construction specifications by qualified personnel other than those responsible for the original design.

7.2.4 Design Review and Verification

DOE4700.1 Chapter III.D.2.c.

Design Control. Design controls should be established to enable designs to be correctly translated into specifications, drawings, procedures, and instructions. The measures for accomplishing these translations and the attendant design reviews and provisions for independent assessment inputs should be addressed. Design change control, including field changes, should be subject to design control measures commensurate with those applied to the original design, and should be approved by the organization that performed the original design.

DOE6430.1A Section 0140[10]

To the extent practicable, and particularly in the case of innovative design, the design should be independently reviewed by competent consultants in construction or manufacturing techniques to confirm the practicability of construction or manufacture.

7.2.5 Design Change Controls

DOE4700.1 Chapter III.C.2.b

Configuration Control.

Documentation may be changed as agreed to by DOE and as described in the contractor's configuration management plan. Contractor proposed changes should be screened by the contractor to determine whether DOE approval is required prior to implementation. If prior approval is required, the change shall be formally proposed to the project office prior to implementation. The project office will approve or disapprove the change or endorse and forward to the next higher board if the change exceeds the project office approval authority. If prior DOE approval is not required, the contractor may implement the change. The contractor's control system should:

(a) Permit identification of the status of a proposed change;
(b) Permit identification of the status of change implementation; and
(c) Provide an audit trail of change history.

DOE4700.1 Chapter III.C.4.b.(1)

Changes affecting the configuration of an item are to be limited to those which are necessary or offer significant benefits to the Department. Changes are required to:

7.0 ENGINEERING PROGRAM

(a) Correct deficiencies;
(b) Incorporate approved changes in operational or logistic support characteristics;
(c) Effect substantial life cycle cost savings; or
(d) Correct safety deficiencies.

DOE4700.1 Chapter III.C.4.b.(2)

The project office ensures that all data required for effective evaluation of changes are made available to those individuals responsible for change decisions. For example, an analysis of the effect caused by the change in the item's performance as prescribed in the configuration identification should be provided. Insofar as practicable, test data needed to validate claimed technical and economic advantages will also be included in this analysis. Every proposed configuration change affecting Departmental interests should be evaluated on the basis of the change criteria, including not making the proposed change. The evaluation should take into consideration all aspects of the change on the products or systems with which it interfaces and other contractors affected. Such aspects may include design, performance, cost, schedule, operational effectiveness, logistics support, transportability, and training.

DOE5480.19 Attachment I, Chapter VIII, Section C.9

Temporary Modification Control
Administrative control systems should be established for installation of temporary modifications such as electrical jumpers, lifted leads, pulled circuit boards, disabled annunciators/alarms, mechanical jumpers/bypasses, temporary setpoint changes, installed or removed block flanges, disabled relief or safety valves, installed or removed filters or strainers, plugged floor drains, and temporary pipe supports. Prior to modification, these controls should provide for communicating the installation of temporary modifications to the design authority to allow for technical oversight and an evaluation of the impact on current design activities, and approval of the design modification. These control systems should make provisions for safety reviews, installation approval, independent verification of correct installation and removal, documentation of the modification, update of operating procedures and documents, training, marking of installed modifications, and periodic audits of outstanding modifications.

8.0 CONSTRUCTION PROGRAM

8.0 CONSTRUCTION PROGRAM

8.0 Construction Program

DOE1300.2A Section 7.a Introduction

Policy. Adherence to appropriate NGSs in the design, construction, testing, modification, operation, decommissioning, decontamination, and remediation of DOE's facilities and activities is necessary for the successful implementation of the Department's policies. Standards proven through years of experience and accepted by professional and technical societies shall be used wherever applicable. No matter how carefully conceived and properly developed, technical standards cannot address all eventualities. Therefore, DOE employees and contractors must critically assess the standards in use at DOE facilities to ensure that they remain consistent with the latest information arising from operational experience and developments in science and technology. Where standards do not exist or where existing standards do not suffice, appropriate DOE standards shall be developed and adopted.

8.1 Management and Administration

DOE4700.1 Chapter II.A.3.d.[1]

The project management plan (PMP) is the document which sets forth the plans, organization, and systems that shall be utilized by those responsible for managing the project.

DOE4700.1 Chapter II.A.3.d.[2]

The PMP is developed by the project manager and approved by the Head of the Field Element.

DOE4700.1 Chapter II.A.3.d.[3]

As a minimum, it should include the project objectives; the project management organization and assigned responsibilities; the work plan; the work breakdown structure; the schedule through all applicable phases of the life cycle and the major milestones; the performance criteria; cost and manpower estimates; project functional support requirements; project management, measurement, and planning and control systems (technical, cost and schedule); and information and reporting procedures.

DOE4700.1 Chapter III.E.1.b.[1]

Construction management includes implementing procedures and providing guidance for project activities that occur during the execution phase of a project.

DOE4700.1 Chapter III.E.1.b.[2]

The execution phase begins upon completion of detailed design and receipt of construction funds at the level responsible for project management, and continues until the completion and closeout of the construction effort.

8.1.1 Policies and Procedures

DOE4700.1 Attachment III-7.2.a.(1)

The contractor's management control systems shall include policies, procedures, and methods which are designed to ensure that they will accomplish the following: Define all authorized work and related resources to meet the requirements of the contract, using the framework of the contract work breakdown structure.

8.1.2 Authority and Responsibility

DOE4700.1 Chapter II.B.2.[1]

The project manager is responsible for preparation of the project WBS.

DOE4700.1 Chapter V.A.3.b.(1)

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:

8.0 CONSTRUCTION PROGRAM

DOE4700.1 Chapter V.A.3.b.(2)

Among the usual functions of the project manager are the following: Acts as the principal contact and serves as the liaison for the exchange of information between the contractor and DOE;

DOE4700.1 Chapter V.A.3.b.(4)

Among the usual functions of the project manager are the following: Assures compliance by the contractor with the technical, safety, and administrative requirements of the contract;

DOE4700.1 Chapter V.A.3.b.(5)

Among the usual functions of the project manager are the following:

Participates in the formulating of, and approving, plans and schedules;

DOE4700.1 Chapter V.A.3.b.(6)

Among the usual functions of the project manager are the following:

Arranges for contacts between the construction contractor, other participants, and appropriate staff, as required;

DOE4700.1 Chapter V.A.3.b.(7)

Among the usual functions of the project manager are the following:

Assures continuity in performance and information exchange among the project team participants;

8.1.3 Staffing and Training

DOE4700.1 Attachment II-4.2.c.[6]

The staffing plans for the project organization should be described in detail; this will include both the present staff organization and future staffing plans, the mix of dedicated project staff, grade levels, and the manpower plan by fiscal year.

8.2 Program Activities

DOE4700.1 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.

DOE4700.1 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).

DOE4700.1 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.

8.0 CONSTRUCTION PROGRAM

8.2.1 Planning

DOE4700.1 Attachment II-4.1.[1]

The project management plan (PMP) is the document which sets forth the plans, organization, and systems that those responsible for managing the project shall utilize.

DOE4700.1 Chapter II.A.3.[1]

Project planning documentation is necessary to establish approved project scope and technical performance requirements, schedules, resource plans, levels or responsibility and authority, organizational interfaces, implementation plans, and accountability.

DOE4700.1 Chapter II.A.3.b.[1]

The project plan serves as the initial overall project baseline and provides the baseline against which project progress is measured in terms of cost, schedule, and technical performance.

DOE4700.1 Chapter V.A.2.c.(1) [2]

Any other project that cannot be managed by use of the locally established general management plan described in subparagraph (2), below, shall also have a specific management plan.

DOE4700.1 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.

DOE4700.1 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.

DOEN4700.5 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.

8.2.2 Scheduling

DOE4700.1 Attachment III-7.2.b.(1)

The contractor's management control systems shall include policies, procedures, and methods which are designed to ensure that they will accomplish the following: Schedule the authorized work in a manner which describes the sequence of work and identifies the significant task interdependencies required to meet the development, production, construction, installation, and delivery requirements of the contract.

DOE4700.1 Chapter III.F. 9.a.(2)[3]

Although no specific scheduling techniques are required by the criteria, all authorized work shall be formally scheduled in a manner which shall permit the evaluation of actual progress against contract milestones, and the contract master schedule shall be clearly supported by lower-level schedules.

DOE4700.1 Chapter V.C.2.h.(1)(a) [1]

To the extent possible, schedules for engineering, procurement, and construction services shall be established concurrently to assure assignment of adequate time for performance and to properly coordinate the accomplishment of the services.

DOE4700.1 Chapter V.C.2.h.(1)(a) [2]

Construction completion of project elements shall satisfy operating requirements, including time for tests and adjustments prior to operation.

8.0 CONSTRUCTION PROGRAM

DOE4700.1 Chapter V.C.2.h.(1)(a) [3]

If required completion dates do not permit normal performance periods, the available time must be allocated to achieve maximum overall economy, based on a careful determination of the feasibility and cost of performance of each service in less than normal time.

DOE4700.1 Chapter V.C.2.h.(1)(a) [4]

Sometimes the total time available may not, by any reasonable allocation, allow completion of all design prior to starting construction. Under such conditions, the design shall be scheduled so that logically separable portions of the work, such as sitework, foundations, superstructure, mechanical, and equipment installation can be awarded as separate contracts, bearing in mind that for maximum effectiveness a contractor should have, subject to security limitations, full control of the area in which he is working.

DOE4700.1 Chapter V.C.2.h.(1)(a) [5]

Sequential fixed-price contracts should be scheduled to permit orderly progress and timely completion.

DOE4700.1 Chapter V.C.3.a.(3) [1]

After the award of the contract, the contractor shall be required to submit proposed schedules for the major features of the work and for the overall project, as well as a cost breakdown covering each element or subdivision of the schedule.

DOE4700.1 Chapter V.C.3.a.(3) [2]

The schedules and the breakdown estimates shall be reviewed by the project manager and/or the architect-engineer and approved by the contracting officer.

DOEN4700.5 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.

DOEN4700.5 Attachment 2, Section 2.a.(4)(b)3

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.

DOEN4700.5 Attachment 2, Section 2.a.(4)(b)4

Summarize the detail schedule activities to form master and intermediate level schedules as required. Maintain identification of milestones with appropriate schedule levels.

8.2.3 Cost Estimating

DOE4700.1 Attachment II-4.2.b.(3)

The following types of objectives shall be stated: Cost objectives for work breakdown structure level one, two, and three elements and their relationship to the total project cost provided in the project plan.

DOE4700.1 Attachment II-5.3.a.

Each project, no matter how small, shall have a two- or three-level WBS.

DOE4700.1 Attachment II-5.3.c.(2)[1]

The project budget shall consist of a set of plots of expenditures versus time, one for each project element and one for the total project.

DOE4700.1 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.

DOE4700.1 Chapter II.D.5.d.[1]

A contingency analysis shall be performed on all project cost estimates.

8.0 CONSTRUCTION PROGRAM

DOE4700.1 Chapter II.D.5.d.[2]

The statement should simply indicate what rationale or thought process the estimator used to reach the conclusions.

DOE4700.1 Chapter II.D.5.d.[3]

On simple or preconceptual design projects, an overall bottom line percentage will suffice.

DOE4700.1 Chapter II.D.5.d.[4]

For more complex, better detailed, or more expensive projects, individual cost elements or work breakdown structure elements should be evaluated and documented individually.

DOE4700.1 Chapter II.D.5.f.

To ensure that contingency is properly managed during execution of the project, the project manager shall develop a contingency plan, which shall be an integral part of the project management plan.

DOE4700.1 Chapter V.A.2.f. [1]

Cost estimates should always be fully documented and contain the type of estimate, reference year for the dollar figures utilized and date of the estimate.

DOE4700.1 Chapter V.A.2.f. [3]

The estimate documentation shall include the details on the contingency allowance development.

DOE4700.1 Chapter V.A.2.f.(2) [1]

Included in all cost estimates should be a contingency fund comprised of costs which may result from incomplete design, changes due to unforeseen, uncertain, and/or unpredictable conditions (e.g., construction work disturbances due to operations), and expected costs/savings associated with projected market conditions.

DOE4700.1 Chapter V.C.3.a.(3) [1]

After the award of the contract, the contractor shall be required to submit proposed schedules for the major features of the work and for the overall project, as well as a cost breakdown covering each element or subdivision of the schedule.

DOE4700.1 Chapter V.C.3.a.(3) [2]

The schedules and the breakdown estimates shall be reviewed by the project manager and/or the architect-engineer and approved by the contracting officer.

DOE5700.2D PREAMBLE: Section 8.a.

Cost estimates shall be developed and maintained throughout the life of each project. The project manager is responsible for the official baseline estimate, and should ensure that adequate design has been accomplished on which a credible estimate can be performed, before the project enters the budget process.

DOEN4700.5 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.

DOEN4700.5 Attachment 2, Section 2.a.(3)(b)2

Prepare estimates, as applicable, in accordance with established project phases, maintaining a distinction between Total Estimated Cost and Total Project Cost. Maintain an appropriate cost estimating capability to accommodate project estimates-to-complete and estimates-at-completion.

8.0 CONSTRUCTION PROGRAM

8.2.4 Constructibility/Maintainability/Value Engineering

DOE4700.1 Chapter V.A.2.q.(2)

Maintainability considerations shall include: Ease of replacement or installed equipment;

DOE4700.1 Chapter V.A.2.q.(3)

Maintainability considerations shall include: Accessibility of installed equipment and building systems for performance of maintenance;

DOE4700.1 Chapter V.A.2.q.(5)

Maintainability considerations shall include: Provisions of maintenance instructions and as-built drawings, especially the location of underground and otherwise concealed utility lines, process chemical and coolant piping.

DOE4700.1 Chapter V.C.2.h.(2)(a) [1]

In determining the manner and method of performance, consideration should be given to constantly evolving innovations which may result in improvements in the traditional methods of design and construction of buildings and facilities required for accomplishment of programs.

DOE4700.1 Chapter V.C.2.h.(2)(a) [2]

New practices should be adopted which will reduce design and construction time; use of other cost saving techniques should be maximized; and new methods of contracting should be considered which will produce economies in construction costs.

8.2.6 Contract Selection

DOE4700.1 Attachment II-7.3.e.(1)[2]

This includes a description of the means by which competition will be obtained and sustained in the performance of these activities, such as through use of parallel development contracts containing options for extension from one phase of the project to another.

DOE4700.1 Attachment II-7.3.e.(2)

This element consists of discussion of the following items: The types of solicitation documents that will be used to obtain proposals for performing the project work, including qualification criteria (if any) and evaluation criteria to be used in judging those proposals.

DOE4700.1 Attachment II-7.3.f.[2]

Because their presence may create special contractual needs if other Government agencies, consortia, advisory committees, nonprofit organizations, laboratories, other operating and onsite service contractors, or integrating contractors will be involved in a project, their roles and any special contractual arrangement(s) governing their roles should be described in this element.

8.2.7 Construction Program Controls

DOE4700.1 Chapter III.F. 5.a.[2]

The management plan describes how to produce the products identified in the contractual agreement, and names the management control systems to be used to manage that performance.

DOE4700.1 Chapter III.F. 5.a.[3]

It is required as part of the proposal and after negotiations become a binding part of the contractual agreement.

DOE4700.1 Chapter III.F. 8.a.[1]

Departmental policy requires that the CSCSC approach (full or modified) be implemented contractually on all new major system acquisitions, major projects and other projects as program Secretarial Officers may elect.

DOE4700.1 Chapter V.A.2.o.(2)(a) [1]

A submittal control system shall be established and operated.

8.0 CONSTRUCTION PROGRAM

DOE4700.1 Chapter V.A.2.o.(2)(a) [2]

The project manager shall assure the contractor establishes and follows a plan for shop drawings, test results, and certification submittals.

DOE4700.1 Chapter V.A.2.o.(2)(a) [3]

The project manager shall also assure that the architect-engineer, construction manager, or Government personnel act on a timely manner on approval of shop drawings, test results, and certifications.

DOE4700.1 Chapter V.A.2.o.(2)(b) [1]

A reporting system shall be established and operated.

DOE4700.1 Chapter V.A.2.o.(2)(b) [2]

The system shall include quality assurance reports from contractors and quality inspectors together with procedures for reviewing the reports and taking prompt effective action on quality assurance.

DOE4700.1 Chapter V.A.2.o.(2)(c)

Adequate staffing of quality assurance inspectors and assurance that they are qualified to perform the job shall be provided.

DOE4700.1 Chapter V.A.2.o.(2)(d)

Continual checks shall be made to assure that all of the quality assurance functions specified in the quality assurance plan are being performed and prompt corrective actions are being taken when necessary.

DOE4700.1 Chapter V.A.2.o.(2)(e)

All quality assurance reports, x-rays, and other quality assurance documents shall be filed and stored in Department-controlled storage facilities.

DOE6430.1A Section 0150-1

SITE DEVELOPMENT

During site development construction activities:

o The area beyond the construction limits shall not be unnecessarily disturbed.

o The impact of construction activities on the environment and existing facilities shall be minimized through the use of silt fencing, dust palliatives, soil waterproofers, etc., in accordance with TM 5-830-3.

o Site resources such as soil, timber and water shall be effectively used.

o Potential effects on existing safeguards and security shall be assessed and necessary precautionary measures implemented.

o Construction materials and installed work shall be protected from damage.

o Construction materials and installed work that have been damaged during construction activities shall be replaced.

o Existing utilities and other structures that are to remain in place shall be located by survey, staked, and protected from disturbance.

Where feasible, the following temporary and permanent facilities shall coincide to minimize the area of disturbance within the construction limits:

o Drainage and erosion control measures

o Horizontal and vertical access road alignments

o Parking and storage areas

See Section 0250-3, Roads, and Section 0250-4, Parking Areas, for further criteria.

Where construction will affect off-site activities, local government and law enforcement agencies shall be notified.

Traffic control measures shall be implemented to minimize interference between construction activities and local vehicular and pedestrian traffic. Work zone traffic control plans shall be implemented and shall include necessary barricades, detours and signage. Such plans shall comply with ANSI D6.1.

Disturbance of the natural terrain shall be minimized during site grading. Where feasible, natural flora on or adjacent to the construction site shall be preserved and protected from vehicular and pedestrian traffic with temporary fencing. In locations where topsoil is not readily available, all topsoil within the area of disturbance shall be scalped and stockpiled in a designated location, for later use in landscaping and revegetation efforts. Excess topsoil, if any, shall be preserved and stockpiled in a designated location for future use at other construction sites. Natural flora in unlandscaped areas shall be reestablished where disturbed by construction activities. Revegetation operations shall coincide with other

8.0 CONSTRUCTION PROGRAM

landscaping activities. Where revegetation is not feasible due to adverse climatic conditions (i.e., desert climate) other methods of soil stabilization shall be implemented (e.g., terraces, benches, dikes, chemical soil stabilizers, mulches and mulch tacks).

Cultural resource sites of archaeologic and historic significance that lie within the boundaries of DOE installations shall be identified within the site EIA.
Archaeologic and historic sites shall be reconsidered during preparation of CDRs and ADMs for new construction. New construction shall comply with each site's historical preservation plan. Archaeologic and historic site clearances for new construction shall be obtained prior to Title I Preliminary Design. The elevation and mitigation process associated with archaeologic and historic site clearances shall include testing, documentation, site stabilization (preservation measures), and consultation with the State Historical Preservation Office. Where feasible, archaeologic and historic sites shall be protected and preserved in accordance with Executive Order 11593, Section 106 of the NPHA of 1966, and 36 CFR 800. Construction materials and installed work at the construction site shall be protected from damage. Temporary security fencing shall be installed, as required, at unsecured construction sites to prevent vandalism or theft. See Section 0150-5, Temporary Security Fencing.

DOE6430.1A 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.

DOE6430.1A Section 0150-4.2

Construction Facilities and Temporary Controls. Solid Waste. Precautions shall be taken to prevent conveyance of wind-borne refuse beyond the construction limits. Such material shall be collected on a regular basis and consolidated on site. Construction site refuse and other solid waste shall be hauled to an approved landfill on a regular basis. Provisions shall be taken to prevent accumulation of mud and soil on adjoining paved roadways during construction activities.

DOE6430.1A Section 0150-4.3

Air Pollution
Construction refuse and other solid waste shall not be disposed of on-site by open burning without prior approval of the cognizant DOE Facilities Engineering Group. Precautions shall also be taken to minimize the release of gases, vapors and exhaust emissions during site development construction activities. Dust palliatives and soil waterproofers shall be used to mitigate air quality impacts. Generation of airborne particulate matter by vehicle movement shall be minimized in accordance with TM 5-830-3 by limiting the area of disturbance at the construction site, by frequent roadway spraying with water or surfactants, or by other methods that adequately control dust. To mitigate dust generation during construction activities, placement of permanent roadway and parking area pavements shall be scheduled during early stages of construction. Where pavement damage by construction equipment precludes early placement of permanent roadway and parking area pavements, base course material shall be among other dust control measures considered as alternatives.

DOE6430.1A Section 0150-4.4

Water Pollution and Soil Erosion
Effective temporary measures shall be implemented to minimize water pollution and soil erosion during construction activities. Where feasible, placement of permanent site improvements (e.g., drainage, erosion control, landscape, roadway base course and pavement) shall be scheduled during early stages of construction to minimize the duration of exposure of erodible soils. Temporary stormwater diversion and detention facilities shall be provided where early placement of permanent improvements is impractical. During construction, temporary bridges or culverts shall pe provided at all access road drainage crossings. Where feasible, construction activities shall be scheduled to avoid the rainy season. Precautions shall also be taken to prevent discharge of liquid contaminants (such as fuels, lubricants and other toxic substances) to the environment. Temporary facilities for disposal of sanitary wastewater shall be provided.

DOE6430.1A Section 0150-4.5

Noise Pollution
The impact of noise pollution on site personnel, adjacent activities and existing facilities shall be assessed prior to site development construction activities. Precautionary measures shall be implemented to mitigate such impacts where they are significant.

8.0 CONSTRUCTION PROGRAM

DOE6430.1A 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
- 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.

See Section 0283-3, Permanent Security Fencing.

8.2.7.1 Work Control

DOE4700.1 Chapter II.C.3.b.[2]

Each work package shall be measurable in terms of performance, and include sufficient specifications of verifiable events or deliverables to mark project achievement.

8.2.7.2 Change Control

DOE4700.1 Chapter III, Section 4.b(1)

Change Control.
(1) Changes affecting the configuration of an item are to be limited to those which are necessary or offer significant benefits to the Department. Changes are required to:

(a) Correct deficiencies;
(b) Incorporate approved changes in operational or logistic support characteristics;
(c) Effect substantial life cycle cost savings; or
(d) Correct safety deficiencies.

DOE4700.1 Chapter V.C.2.h.(2)(d)1 [1]

Change control procedures for both design and construction must be established early in the execution process.

DOE4700.1 Chapter V.C.2.h.(2)(d)1 [2]

The planned or desired procedures should be included or referenced in the project management plan prior to the start of the execution phase.

DOE4700.1 Chapter V.C.2.h.(2)(d)1 [3]

If consideration for contractor's method of change control is given and his method accepted, the modifications must be included in an update of the project management plan.

DOE4700.1 Chapter V.C.2.h.(2)(d)1 [4]

The adopted procedures for changes should include rigid provisions for reporting the progress of changes timewise by the project manager's organization, in addition to the normal change control reporting provisions.

DOE4700.1 Chapter V.C.2.h.(2)(d)1 [5]

Standard change controls procedures shall be established for projects not having specific project management plans.

8.0 CONSTRUCTION PROGRAM

DOE4700.1 Chapter V.C.2.h.(2)(d)1 [6]

These procedures shall include authorities and responsibilities for changes during both design and construction.

DOE4700.1 Chapter V.C.2.h.(2)(d)2 [2]

During construction, the project manager should have the authority to prevent changes. During this period, changes should not be allowed unless they are operationally required, to meet safety requirements, and/or result in cost savings.

8.2.7.3 Document Control

DOE4700.1 Chapter V.A.2.s.(1) [1]

A project record shall be maintained for all construction projects.

DOE4700.1 Chapter V.A.2.s.(1) [2]

These records should be maintained by the field element for all line item projects. The project record may be maintained by operating contractors at the discretion of field office managers.

8.2.8 Walkthroughs of Construction Sites

DOE4700.1 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.

DOE4700.1 Chapter V, Section A.2.l

Construction Health and Safety. A comprehensive health and safety program must be established and utilized for all Departmental construction projects. The goals of this program are to protect DOE employees, contractor employees, and the general public from hazards; to protect property from damage, and to prevent delay or interruption in the Department's programs caused by accidents and fires in connection with construction activities. The authorities, responsibilities, and standards for construction safety are contained in DOE 5480.1A, DOE 5481.1A, and DOE 6430.1, Chapter 10. Consideration of safety requirements must begin early in the planning phase of a project to ensure that they are included in all plans, studies, schedules, and cost estimates. An example of a safety requirement which must begin early is the case in which additional real estate may be required to achieve fire separations necessary to meet the improved risk criteria of DOE 5480.1A.

8.2.9 Testing and Start-Up

DOE4700.1 Attachment III, Section 4.4.b(5)

Test Procedure Changes. Changes which unnecessarily increase the scope of existing procedures, and which are not required for safe operation or to correct errors, should not be submitted. Procedure change requests must be submitted to the plant contractor, must include the reason why the change is required, and must give a technical evaluation showing why the change is satisfactory. The contractor should obtain concurrence of the board in the need for a change prior to submitting the change request for approval.

DOE4700.1 Attachment III, Section 4.4.c

DOE Project Test Index. The test index is a summary of all project testing to be performed during the construction period. For existing projects, in addition to specifically identifying each test to be performed, the index also identifies the reason for the test (acceptance test, repair, and so forth) and the document used for the test requirement and/or procedure. For new construction projects, the test index is prepared and approved as follows:

8.0 CONSTRUCTION PROGRAM

(1) Prepared by the contractor;
(2) Approved by the Department;
(3) Issued by the contractor in sufficient time to allow planning; and
(4) Changes to the test index approved by DOE and issued by the contractor.

DOE4700.1 Attachment III, Section 4.4.d

Project Test Sequence. The project test sequence consists of tests, parts of tests, and significant events for each plant arranged in order of performance so that all prerequisites for testing are met and so results will provide the data required to satisfactorily complete the test program and the sequence for project safety. The test sequence is prepared, reviewed, and approved, and issued in the same manner as specified in subparagraph 4c above, for the test index, and is submitted with or subsequent to the test index.

DOE4700.1 Attachment III-4.1.b. [2]

Test specifications and procedures are required for components, systems, and subsystems which are contract end items; will be contractually identified; and will be referenced in the quality assurance plan.

DOE4700.1 Attachment III-4.4.e.(1)

Key Events which Require prerequisite Lists. For key events in a test program, prerequisite lists are prepared which specify the requirements to be satisfied in order to assure readiness and safety to perform the event. Accomplishment of the items indicated in these lists is considered to be the minimum required prior to the performance of the specified event. Additional requirements may be incorporated into these lists. The following key events require prerequisite lists:

(a) Initial individual component testing;
(b) System operations minimum parameters;
(c) System operations normal parameters;
(d) Initial operations testing; and
(e) Full operation.

DOE4700.1 Attachment III-4.4.f. [1]

A set of test instructions shall be prepared by the contractor to establish the detailed procedures for administration, control, and performance of project equipment testing by the contractor.

DOE4700.1 Attachment III-4.4.f. [2]

The test instructions shall implement those requirements and additional local requirements for the administration, control and performance of project testing, as required.

DOE4700.1 Chapter III, Section D.2.k

Test Control. A test program should be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service, is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. The test program should include, as appropriate, proof tests prior to installation, preoperational tests, and operational tests during facility operation of structures, systems, and components. Test procedures should include provisions for assuring that all prerequisites for the given test have been met, that adequate test instrumentation is available and used, and that each test is performed under suitable environmental conditions. Test results should be documented and evaluated to assure that test requirements have been satisfied.

8.0 CONSTRUCTION PROGRAM

8.2.9.1 Prerequisite Testing

DOE4700.1 Attachment III, Section 4.3.a(1)

Installation Checks. This phase will include a visual inspection by system of all components and equipment to assure that installation is in accordance with design plans. Fluid systems will be checked for proper arrangement, including locating and mounting of components, hanging and anchoring of piping, alignment and bolting of machinery locking devices, space envelopes required for maintenance, and the accessibility of operating parts of the system. Instrumentation and control systems will be checked for proper installation,
including grounding, connections, mechanical operability of components, and proper wiring, including wrapping, servicing, sleeving, and marking. Circuit continuity, wiring, insulation, and proper ventilation will be checked, including heat dissipation features.

DOE4700.1 Attachment III, Section 4.3.a(2)

Flushing and Strength and Tightness Tests. Upon completion of the point of construction at which filling can proceed, the fluid systems are filled and flushed. The strength and tightness of fluid systems are proven by hydrostatic testing. Appropriate piping systems are fitted with filters that simulate the pressure drop and a test head prior to filling and instrumentation and control systems are calibrated. The calibration tests are conducted prior to, and concurrently with, strength and tightness tests sequenced to meet test procedure requirements.

8.2.9.2 Preoperational Testing

DOE4700.1 Attachment III, Section 4.3.a(3)

System Operation Testing with Minimum Parameters. Fluid systems are operated at minimum parameters for operation of appropriate equipment in order to assure, at the earliest possible date, that all components are operable and ready for further testing.
Instrumentation and control testing proceed concurrently, sequenced to meet test procedure requirements.

DOE4700.1 Attachment III, Section 4.3.a(4)

System Operation with Normal Parameters. When fluid systems have been tested adequately to indicate that operating parameters can be reached, the systems are tested at designated higher parameters. Safety and protection devices are tested as parameters are increased. When all testing designated for this period has been satisfactorily completed, the designed parameters are reduced, the filters are removed, and the entrapped contents are examined.

8.2.9.3 Start-up/Turnover

DOE4700.1 Chapter V, Section C.3.d.(4).(d).1

Upon substantial completion of construction and acceptance testing, a preliminary inspection usually should be made. This will establish the number of work items remaining to be completed and permit preparation of a list of exceptions. The A-E, construction manager, construction, and operating contractors should participate in the inspection. The field element may, as appropriate, assign Departmental personnel to participate in the inspection. A date should be set for the performance of the final inspection, allowing time for completion of exceptions.

DOE4700.1 Chapter V, Section C.3.d.(4).(d).2

Final inspection should be made by all parties who participated in the preliminary inspections. They shall indicate in writing that such inspection was made and note any further exceptions. Upon cleanup of such exceptions, the work is finally accepted through the signing of documents by the field element, construction manager, A-E, and construction and operating contractors, as appropriate.

8.0 CONSTRUCTION PROGRAM

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9.0 OPERATIONS

9.0 OPERATIONS

9.0 Operations

Conduct of Operations

The K-Basin conduct of operations requirements derived from DOE Order 5480.19 are contained in the K-Basin Conduct Of Operations Graded Approach Applicability Matrix, WHC-CM-5-13, Section 2.0, Rev. 2. DOE Order 5480.19 Preamble, Section 5.c is included below which requires the contractor to submit an applicablility matrix conforming to Attachment 1 of that DOE order.

DOE Order 5480.19 Preamble, Section 5.c

Conformance with the requirements of the Order shall be documented. However, it is not necessary to develope 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.

10.0 MAINTENANCE

10.0 MAINTENANCE

10 Maintance

Maintance Implementation Statement

The requirements for this functional area of the K-Basins S/RID are found in the K-Basins Maintenance Implementation Plan (MIP) dated March 31, 1995. The MIP was transmitted to DOE/RL by letter from T.B. Veneziano to E.D. Sellers, 9501039B.R1 dated March 31, 1995. These requirements are not repeated here in an effort to preclude duplicating existing work. This implementation plan contains the citation of the requirement, description of how the requirement is implemented, and description of what corrective actions are planned to achieve compliance to the requirement.

11.0 RADIATION PROTECTION

11.0 RADIATION PROTECTION

11.0 Radiation Protection

Radiation Protection Implementation Statement

K-Basins will conduct the radiation protection program in accordance with the requirements of 10 CFR 835 by implementation of the DOE approved WHC 10 CFR 835 Radiation Protection Plan, the Hanford Site Radiological Control Manual, and WHC Radiological Control Manual Implementation Plan.

The requirements for this functional area of the K-Basins S/RID are found in the WHC Radiation Protection Program - Implementation of Title 10 Code of Federal Regulations Part 835, WHC-SP-1145, Rev.0. These requirements are not repeated here in an effort to preclude duplicating existing work. This implementation plan contains the citation of the requirement, description of how the requirement is implemented, and description of what corrective actions are planned to achieve compliance to the requirement.

12.0 FIRE PROTECTION

12.0 FIRE PROTECTION

12.1.1.1 Program Policy

DOE5480.19 Attachment I, Chapter I, Section C.1

Operations Policies
Procedures or other definitive documentation should specify policies that are to be applied for operations. These policies should also 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.

DOE5480.7A Section 4

The objectives of this Order are as follows:

a. Minimize the potential for the occurrence of a fire.

b. Ensure that fire does not cause an on-site or off-site release of radiological and other hazardous material that will threaten the public health and safety or the environment.

c. Establish requirements that will provide an acceptable degree of life safety to DOE and contractor personnel and that there are no undue hazards to the public from fire and its effects in DOE facilities.

d. Ensure that process control and safety systems are not damaged by fire or related perils.

e. Ensure that vital DOE programs will not suffer unacceptable delays as a result of fire and its effects.

f. Ensure that property damage from fire and related perils does not exceed an acceptable level.

DOE5480.7A Section 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.

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.

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 a 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 code of standard.

DOE5480.7A Section 6

DOE REFERENCED CRITERIA. The following references contain additional criteria and guidelines pertaining to the DOE Fire Protection Program:

12.0 FIRE PROTECTION

a. DOE Fire Protection Resource Manual.
b. "General Fire Fighting Guidance for Nuclear Weapons," (this document is Confidential Restricted Data) (TP20-11) (DOE).
c. DOE 5482.1B, ENVIRONMENT, SAFETY, AND HEALTH APPRAISAL PROGRAM, of 9-23-86, which establishes the environmental protection, safety, and health protection appraisal program.
d. DOE 5484.1, ENVIRONMENTAL PROTECTION, SAFETY, AND HEALTH PROTECTION INFORMATION REPORTING REQUIREMENTS, of 2-24-81, which establishes procedures for the reporting of information having environmental protection, safety, or health protection significance.
e. DOE 5500.1B, EMERGENCY MANAGEMENT SYSTEM, of 4-30-91, which establishes procedures for planning for emergencies involving DOE or requiring DOE assistance.
f. National Fire Protection Association Handbooks.
g. Factory Mutual Loss Prevention Data Sheets.
h. Society of Fire Protection Engineers (SFPE) Handbook.
i. DOE Explosives Safety Manual, DOE/EV/06194.
j. Local and State fire protection criteria.
k. American Petroleum Institute Guidelines.
l. NFPA guides, manuals and recommended practices.
m. "Product Directories of Underwriters Laboratories," together with the periodic supplements (UL).
n. "Factory Mutual Research Corporation Approval Guide" (FM).

DOE5480.7A Section 9.a(1)

Fire Protection Criteria. A documented "Fire Protection Program" which includes:

(a) A statement of management commitment to achieve the above stated objectives.

(b) A policy statement that implements this Order and other DOE fire protection related mandatory codes and standards.

(c) 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.

12.1.1.2 Responsibilities

29CFR1926 Part 150(a)(1)

Occupational Health and Safety Standards for the Construction Industry - Fire Protection - General requirements. The employer shall be responsible for the development of a fire protection program to be followed throughout all phases of the construction and demolition work, and he shall provide for the firefighting equipment as specified in this subpart. As fire hazards occur, there shall be no delay in providing the necessary equipment.

29CFR1926 Part 150(a)(2)

Access to all available firefighting equipment shall be maintained at all times.

29CFR1926 Part 150(a)(3)

All firefighting equipment, provided by the employer, shall be conspicuously located.

29CFR1926 Part 150(a)(4)

All firefighting equipment shall be periodically inspected and maintained in operating condition. Defective equipment shall be immediately replaced.

29CFR1926 Part 150(a)(5)

As warranted by the project, the employer shall provide a trained and equipped firefighting organization (Fire Brigade) to assure adequate protection to life.

12.0 FIRE PROTECTION

DOE5480.7A Section 8.i

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 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.

12.1.1.3 Organizational Interfaces

DOE5480.19 Attachment I, Chapter I, Section A

The organization and administration of operations should ensure that a high level of performance in DOE facility operations is achieved through effective implementation and control of operations activities. Operations activities should recognize that environment, safety, and productivity are compatible goals. DOE facility policies should describe the philosophy of standards of excellence under which the facility is operated and clear lines of responsibility for normal and emergency conditions are established. Effective implementation and control of operating activities are primarily achieved by establishing written standards in operations, periodically monitoring and assessing performance, and holding personnel accountable for their performance.

12.1.2 Administrative

DOE5480.7A Section 9(1)

A DOE facility shall be characterized by a level of fire protection sufficient to fulfill the requirements for the best protected class of industrial risks (Highly Protected 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.

DOE5480.7A Section 9(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.

DOE5480.7A Section 9(3)

This level of protection also includes: administrative procedures encompassing controls for hazardous substances/processes; inspection, maintenance, and testing of fire protection features; and other programmatic fire safety and activities as defined below.

12.0 FIRE PROTECTION

12.1.2.1 Fire Prevention Procedures

DOE5480.7A Section 9.c.(1)

Fire Prevention Procedures. Facilities shall have procedures governing the use and storage of 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

DOE5480.7A Section 9.c.(2)

Assessment Results Tracking Program. There shall be a program to identify, prioritized 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

DOE5480.7A 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

DOE5480.7A 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

DOE5480.7A 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

DOE5480.7A Section 9.c.(6)

Training. Training shall be provided for the individuals within the fire protection organization, the fire department/brigade, and any other person with responsibilities for fire safety. Training programs shall reflect the criteria contained in the mandatory codes and standards listed in paragraph 5 and shall reflect site-specific considerations.

12.1.2.7 Communications

DOE5480.7A 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.

12.0 FIRE PROTECTION

12.2.1.1 Automatic Fire Suppression Provisions

DOE5480.7A Section 9.b.(3)

Automatic Fire Protection - Complete automatic fire suppression systems designed in accordance with applicable NFPA standards shall be provided as follows:

(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.

DOE5480.7A 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.

DOE6430.1A Section 1161.3

Automatic fire suppression provisions shall comply with DOE 6430.1A, Section 1530-99, Special Features. When an automatic fire suppression system is
mandatory and protection against loss from fire originating within the enclosure system is required, a highly reliable, fast-acting system shall be provided. Instead of such a system, an inert atmosphere can be used with in the enclosure, provided its reliability is commensurate with and approved fire suppression system (e.g. dedicated gas supply, component quality and redundancy where appropriate). The oxygen concentration shall be less than the minimum concentration that would allow ignition or combustion of the enclosure contents. Where automatic systems are not required, fire detection shall be installed. Fire detection systems shall be integrated with any central alarm location and any associated automatic fire suppression systems.

DOE6430.1A Section 1530-4.1

Automatic Sprinkler Protection - All sprinkler systems shall comply with NFPA 13.

DOE6430.1A Section 1530-99.0[2]

Fire protection systems shall not:

(1) prevent a facility from achieving and maintaining a safe shutdown condition,

(2) prevent the mitigation of DBA consequences, or

(3) cause an inadvertent nuclear criticality.

DOE6430.1A Section 1530-99.0[3]

Total reliance shall not be placed on a single fire suppression system. Appropriate backup capability shall be provided.

DOE6430.1A Section 1530-99.0[4]

To ensure that redundant safety class components shall be capable of performing the necessary safety functions, the facility design shall provide appropriate separation against fire, explosion, and failure of fire suppression systems.

DOE6430.1A Section 1530-99.0[5]

Fire protection systems, or portions of them, that must function to control effects of a DBA event (as determined by safety analysis accident

12.0 FIRE PROTECTION

scenarios)
shall be designed to be functional for all conditions included in the accident scenario. This shall include both the event initial cause and its consequences.

DOE6430.1A Section 1530-99.0[6]

Mechanical- and fluid-system portions of the fire protection system shall meet the appropriate NFPA requirements.

DOE6430.1A Section 1530-99.0[7]

The operation or failure of a fire protection system that interfaces with a safety class system, such as a safety class water system, shall not prevent the safety class system from completing its safety functions when required. Wherever practical, special facilities shall be designed and constructed using building components of fire-resistant and noncombustible material, particularly in locations vital to the functioning of confinement systems. To the extent practicable, combustible materials shall not be used in the construction of process system confinement barriers.

DOE6430.1A Section 1530-99.0[9]

When the use of water sprinkler coverage is precluded because of nuclear criticality or other hazards, nonaqueous extinguishing systems (i.e., inert gas, carbon dioxide, high-expansion foam, or halogenated organics) shall be used.

DOE6430.1A Section 1530-99.0[10]

Fire protection systems shall be designed so that the failure of any active component (equipment or control device) shall not disable the fire protection
system. Fire protection systems and components shall have fail-safe features and audible and visual alarms for operability and trouble indications.

DOE6430.1A Section 1530-99.0[16]

Automatic water sprinkler coverage shall be provided throughout the facility except in areas where nuclear criticality or other hazards specifically preclude its use or where Halon systems are required to reduce equipment damage.

12.2.1.1.1 Automatic Sprinkler Systems

DOE6430.1A Section 1530-3.1

Water Flow and Pressure Requirements for Fire Protection - Total volume, pressure, and design flow rate of water necessary to provide fire protection
for facilities shall be determined by the methods described in the following paragraphs. All sprinkler or other automatic fire suppression system components shall be UL- or FM-approved for the particular application chosen.

DOE6430.1A Section 1530-3.2

Occupancy Hazard Classification - NFPA 13 shall be used to determine the Occupancy Hazard Classification for any facility. Light hazard occupancy rules are prohibited.

12.2.1.1.2 Wet Pipe Systems

DOE6430.1A Section 1530-4.2.1

Wet Pipe - Sprinkler systems shall normally be wet pipe using pipe schedule sizes listed in NFPA 13 for ordinary installations. Hydraulic designs shall
be considered for all systems. The system shall be hydraulically designed where residual pressure is marginal, water application rate is high, response
time is critical, or special risks are involved.

12.0 FIRE PROTECTION

12.2.1.1.3 Dry Pipe Systems

DOE6430.1A Section 1530-4.2.2

Dry Pipe - In unheated areas or other areas subject to freezing temperatures, dry pipe systems shall be provided. Because of the time delays associated
with release of the air in the system, water demands for dry pipe systems shall be computed over areas 30 percent greater than for comparable wet pipe
systems. Where the unheated area is small it may be cost effective to install an antifreeze system or small dry pipe system supplied from the wet pipe
system in the main heated area.

12.2.1.1.4 Preaction

DOE6430.1A Section 1530-4.2.3

Preaction - A preaction system shall be used where it is particularly important to prevent the accidental discharge of water. Need for a preaction system shall be based on review by and recommendation of a professional fire protection engineer. The detection system chosen to activate the preaction
valve shall have high reliability and a separate alarm/supervisory signal to indicate status. The detection system must be designed to be more sensitive
than the closed sprinklers in the preaction system, but should not be so sensitive as to cause false alarms and unnecessary actuation of the preaction
valve.

12.2.1.1.5 Deluge

DOE6430.1A Section 1530-4.2.4

For extra hazard areas and specific hard-to-extinguish fuels such as explosives and pyrophoric metals, a deluge system with open sprinkler heads may be used to set down the entire protected area simultaneously. Deluge systems shall comply with NFPA 13. If quick response is required, deluge
system piping may be primed with water. The nozzles must be provided with blow-off caps for water-filled deluge systems.

12.2.1.1.6 Self-Restoring

DOE6430.1A Section 1530-4.2.5

Self-Restoring - Self-restoring sprinkler systems, such as the on-off multicycle system or systems using individual on-off sprinkler heads, shall be considered where the water from sprinklers will become contaminated by contact with room contents, where there is a concern for water damage, or where water
supply or storage volume is marginal.

12.2.1.1.7 Quick-Response Sprinklers

DOE6430.1A Section 1530-4.2.6

Quick-Response - Where there are high-value concentrations (values per square foot), quick-response sprinklers shall be considered in lieu of conventional
sprinklers.

12.0 FIRE PROTECTION

12.2.1.1.8 Pressure-Relief Valves

DOE6430.1A Section 1540-1.6.1(B)

Wherever a pressure-reducing valve's failure may cause equipment damage or unsafe conditions, a pressure-relief valve shall be provided downstream of the reducing valve.

12.2.1.1.9 Pressure-Reducing Valves

DOE6430.1A Section 1540-1.6.1(A)

Pressure-reducing valves shall be provided where service pressure at fixtures or devices exceeds the normal operating range recommended by the manufacturer.

12.2.1.2 Special Fire Suppression Systems

DOE5480.7A 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.

DOE6430.1A Section 1530-5.1

Special Protection Systems - Special protection systems may be used to extinguish or control fire in easily ignited, fast-burning substances such as flammable liquids, some gases, and chemicals. They shall also be used to protect ordinary combustibles in certain high-value occupancies especially susceptible to damage. Special protection systems supplement automatic sprinklers as described by NFPA and shall not be used to substitute for them except where water is not available for sprinkler protection. The added expense of the supplementary system shall be supported by documented justification.

DOE6430.1A Section 1530-5.1[2]

The selection of a particular special suppression system shall be based on:

The effectiveness of that system or agent for the type of hazard
The damage likely to be caused by the extinguishing agent, including cleanup and downtime.

12.2.1.2.1 Water Spray

DOE6430.1A Section 1530-5.2.1

Water Spray - Installation of water spray systems shall comply with NFPA 15.

12.2.1.2.2 Carbon Dioxide

DOE6430.1A Section 1530-5.2.2

Carbon Dioxide - Agent quantity requirements and installation procedures shall comply with NFPA 12.

12.2.1.2.3 Dry Chemical

DOE6430.1A Section 1530-5.2.3

Dry Chemical - Systems shall comply with NFPA 17.

12.0 FIRE PROTECTION

12.2.1.2.4 Foam

DOE6430.1A Section 1530-5.2.4

Foam - Foam systems shall comply with NFPA 11, NFPA 11A, NFPA 16, NFPA 16A, and NFPA 409.

12.2.1.3 Fire Extinguishers

DOE6430.1A Section 1530-7

Portable Fire Extinguishers - Portable fire extinguisher shall comply with NFPA 10.

12.2.1.4 Fire Hose and Standpipe

DOE6430.1A Section 1530-6

Standpipes and Hose Systems - Installation of standpipe systems shall comply with NFPA 14.

12.2.1.5 Control of Liquid Runoff

DOE5480.7A 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.

DOE6430.1A Section 1540-99.0.2(1)

Collection systems shall be provided for water runoff, such as from firefighting activities, from areas within special facilities containing radioactive material. Nuclear criticality prevention (if necessary) confinement, sampling, volume determination, and retrievability of liquids and solids shall be provided for in the design of collection systems. The size of the collection system for firefighting water shall be based on the maximum amount of water that would be collected in fighting the DBF. The configuration of the system components shall be based on conservative assumptions as to the concentration of fissile or other materials capable of sustaining a chain reaction that might collect in the system. Recirculating systems shall also be considered when there is no possibility of contamination.

12.2.2.1 Water Supply Systems

DOE5480.7A Section 9.b.(8)

Fire Protection Water Supply - An automatic water supply for fire protection having a minimum two hours stored water capacity shall be maintained. Municipal supplies having the same capability are acceptable, Facilities having a MPFL in excess of $50 million shall be provided with an additional, independent source of fire protection water.

A water supply dedicated for fire protection may be necessary as determined by the PSO. A dedicated system shall be able to meet hose stream and sprinkler system demands.

A combined fire and process/domestic system shall be able to deliver the fire demand plus the maximum daily domestic demand for the required duration.

DOE6430.1A Section 1530-3.3.1

Schedule-Designed Sprinkler System - For systems designed using pipe schedule methods, NFPA 13 shall be used for calculating water demand in the absence of specific requirements provided by the cognizant DOE fire protection authorities based on unusual occupancies or special hazards.

Precautions shall be taken to ensure that adequate residual pressure exists at full demand flow rate to fulfill the density and coverage requirements for schedule-designed systems. If water supply or pressure is marginal the pressure loss from the base of the riser to the most remote head

12.0 FIRE PROTECTION

should be calculated to confirm that the schedule designed-system will meet requirements, or the system shall be hydraulically designed.

DOE6430.1A Section 1530-3.3.2

Hydraulically Designed Sprinkler Systems - NFPA 13 shall be used to determine water supply requirements for hose streams (gpm) and duration (min). Density curves presented in NFPA 13 shall be used for calculating sprinkler demand for hydraulically designed systems. For hazard classifications not covered in NFPA 13 and certain other special occupancies or hazards, design density and area of coverage shall be as specified by other more appropriate standards referenced in NFPA 13 or project-specific requirements as determined by the cognizant DOE fire protection engineer. For ordinary hazard occupancies and above, hose stream requirements shall be a minimum of 500 gpm regardless of the hose stream demands listed in the above references unless otherwise specified by the DOE project criteria. Determination of adequacy of water supply shall be made on the basis of actual flow test data gathered using the methods in NFPA 13, Appendix B.

DOE6430.1A Section 1530-3.3.3

Fire Hydrant Demand - Where reliance is placed on fire department response, either for protection of unsprinklered buildings or where the fire department
will serve as redundant (backup) protection, as a general rule the water supply should be adequate to supply at least 0.03 gpm per cubic foot of fuel
(building and contents) in the largest fire area (for high-BTU-content fuels, convert to equivalent ordinary BTU loads). This water supply should be available at 20 psig residual pressure at the hydrants.

DOE6430.1A Section 1540-99.0.5

On site water supplies and other utilities shall be provided as necessity for emergency use. The design of each utility service or cooling water system shall consider the demands for normal operations, anticipated operational occurrences and DBA conditions.

RLID5480.7 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 shall also ensure that dry pipe system air pressures are normal, and air compressors and air maintenance devices for andy 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.

12.2.2.1.1 Mains, Water Storage, and Fire Pumps

DOE6430.1A Section 1530-9[3]

Underground fire water mains or combined fire and domestic water mains, including valves, hydrants, and fittings, shall be installed, flushed, sterilized, and tested in accordance with NFPA 24 and Section 0260, Piped Utility Materials. Water storage tanks shall comply with NFPA 22. Fire pumps shall comply with NFPA 20. Water storage shall be sufficient to meet the density, pressure, and duration requirements of NFPA 13.

RLID5480.7 Section 8.1.d

Fire flows shall be available for a period of at least two hours. A minimum four-hour supply shall be provided for large building sites, or groups of combustible buildings. Combined systems serving fire protection and other water demands (domestic and/or process), the supply and its distribution system shall be adequately sized to serve the combined peak flow for all uses. When storage tanks are used for combined service water and fire protection water, the minimum volume for fire uses shall be assured by dedicated tank(s) or other physical means, such as a vertical standpipe.

12.0 FIRE PROTECTION

12.2.2.1.2 Redundant Water Supply

DOE6430.1A Section 1530-99.0[17]

The water supply for the permanent fire protection installation shall have a minimum of two reliable, independent sources each with sufficient capacity (based on maximum demand) for firefighting until other sources become available. Only one of these two sources shall be required to be DBE qualified.

12.2.2.2.1 Fire Hydrant Capacity

DOE6430.1A Section 0266-4(2)

Domestic water distribution systems that also serve fire protection requirements shall be designed to satisfy fire flow requirements plus 50 percent of the average domestic requirements plus any industrial or process demands that cannot be reduced during a fire.

DOE6430.1A Section 0266-4(3)

Each fire hydrant within the distribution system must be capable of delivering 1000 gpm at a residual pressure of not less than 10 psi. Where domestic water distribution systems are to serve internal fire protection systems (i.e. sprinklers or foamite systems), adequate residual pressures shall be maintained for proper operation of such fire protection systems.

DOE6430.1A Section 1530-9[7]

Where combined fire and domestic-process water systems are used, the supplies to each building shall be arranged and valved so that the domestic and process systems can be shut down without shutting off the fire system supply.

DOE6430.1A Section 1530-9[8]

Sprinkler risers should be located at an exterior wall. Sprinkler supply lead-ins should run under buildings the minimum distance possible. Where a riser must be located in a potentially contaminated area, consideration should be given to locating the riser exterior to the building in a heated enclosure.

DOE6430.1A Section 1530-9[9]

Outside control valves that can be locked open shall be provided on each supply lead-in, located if possible a minimum distance of 40 feet from the
building. PIVs should be used where possible. If site conditions preclude the use of PIVs, such as where they would be subject to mechanical damage and cannot be properly guarded, OS&Y valves in pits may be used.

DOE6430.1A Section 1530-9[10]

Key-operated buried valves shall not be used for sprinkler control valves. In no case shall there be more than one valve controlling a sprinkler supply lead-in.

DOE6430.1A Section 1530-9[11]

All lead-ins shall be connected with the sprinkler system at the base of the riser. Alarm valves shall be located as close as practical to the building entry point. Hydrants shall be provided so that hose lays from hydrants to all exterior portions of a protected building are no more than 300 feet. Hydrants shall not be closer to buildings than 50 feet.

DOE6430.1A Section 1540-1.1(2)

Domestic water shall be supplied by a separate service line and not be a combined fire protection and potable water service or a combined process water and potable water system within the building.

DOE6430.1A Section 1540-1.3.1

Where domestic or fire water service lines enter buildings, suitable flexibility shall be provided to protect against differential settlement or seismic activity in accordance either the NSPC or NFPA 13, respectively.

12.0 FIRE PROTECTION

12.2.2.2.2 Fire Hydrant Spacing and Location

DOE6430.1A Section 0266-4(9)

Fire hydrants shall be installed at a maximum spacing of 400 feet. Fire Hydrants shall not be located more than 300 feet from the building to be protected. Each building shall be protected by a minimum of two hydrants.

12.2.2.2.3 Air Release and Vacuum Valves

DOE6430.1A Section 0266-4(10)

Air release and vacuum valves shall be installed, as necessary at high points within the distribution system and long supply mains.

12.2.2.2.4 Distribution Systems Mains Depth

DOE6430.1A Section 0266-4(11)

Distribution system mains shall have a minimum depth of cover of 2-1/2 feet, Additional cover shall be provided to prevent freezing in cold climates, at roadway crossings in high traffic areas, and at railroad crossings.

12.2.2.2.5 Dedicated Water Storage and Distribution Systems

DOE6430.1A Section 1530-9

Water Storage and Distribution - Wherever practical, dedicated fire water storage and distribution systems shall be used. If a dedicated fire water supply system cannot be provided, the fire protection water supply shall assure availability regardless of simultaneous process and domestic water
usage.

12.2.2.2.6 Underground Fire Water System Design, Installation, Testing, and Operation

DOE5480.7A Section 9.b.(9)

Underground Piping - Mains shall be sized for the largest fire flows anticipated but in no case shall be less than 8-inch diameter. Supply piping to individual fire sprinkler systems shall be at least as large as the fire sprinkler system riser.

RLID5480.7 Section 8.1.a

Distribution mains, either sanitary or raw water, that are being extended to supply water for domestic and/or process water and will provide water for fire suppression systems (sprinklers and/or hydrants), shall be at least 12 inches in diameter.

12.2.2.2.7 Water Distribution Loop Systems

DOE6430.1A Section 1530-9[4]

Whenever feasible, all water distribution systems shall be of the looped grid type providing two-way flow with sectional valuing arranged to provide
alternate water flow paths to any point in the system.

RLID5480.7 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 a automatic sprinkler system.

RLID5480.7 Section 8.1.c

Water supplies for fire protection shall be of the looped grid type, providing two points of supply and two-way flow with sectional valving

12.0 FIRE PROTECTION

arranged to provide alternate water flow paths from the source to any point in the distribution system, where MPFL exceeds $1 million.

12.2.2.2.8 Fire Mains

DOE6430.1A Section 1530-9[5]

Fire mains (except those supplying a single hydrant or extensions of existing smaller mains) shall be at least 8 inches. Mains shall be sized to supply the largest fire demand plus the largest domestic and process demand with consideration for residual sprinkler system pressure requirements.

12.2.2.2.9 Sprinkler Supply Lead-Ins

DOE6430.1A Section 1530-9[6]

Sprinkler supply lead-ins should be at least 6 inches, except lead-ins of 4 inches may be used for very small sprinkler systems when substantiated by
hydraulic calculations. In no case shall the lead-in be smaller than the sprinkler riser.

12.2.3.1 Fire Barrier Design Requirements

DOE6430.1A Section 0110-6.3

Fire Resistance Ratings - All facilities shall be divided into areas in which the total potential fire loss to each area and its equipment does not exceed $75 million as described in DOE Order 5480.7. These areas shall be separated by fire walls and barriers with not less than 4-hour fire-resistance ratings. Where exceptions are necessary for reasons of operations and equipment, exemption procedures shall comply with DOE Order 5480.7.

DOE6430.1A Section 0727

Firestopping - Firestopping shall comply with NFPA 101, Chapter 6. -
Firestopping materials and assemblies shall be tested for their fire resistance and listed by UL or similar nationally accredited testing laboratories, or shall be listed for their resistance as approved by FM or similar national insurance organizations. Unrated and unapproved assemblies shall be tested and approved before being considered for use in a DOE facility. Where fire-rated assemblies (walls, floor-ceilings, roof-ceilings) are either partially or fully penetrated by pipes, ducts, conduits, or other such building elements, firestopping material shall be placed in and around the penetrations to maintain the fire resistance rating of the assembly.

DOE6430.1A Section 1530-99.0[19]

Where fire barriers are penetrated by the confinement system's ventilation ducting, fire dampers shall be appropriately used to maintain the barrier integrity. However, the closure of such dampers shall not compromise the functions of the confinement system where the loss of confinement might pose a greater threat than the spread of fire. In such cases, alternative fire protection means (e.g., duct wrapping) shall be used as a substitute for fire barrier closure. In no case shall a sprinkler system (including safety class sprinklers) be considered a fire barrier substitute.

12.2.3.2 Fire Doors and Windows

DOE6430.1A Section 0800-1.2

Doors - Fire Protection - Fire doors, frames, and hardware shall be either tested and listed by UL or similar nationally accredited testing laboratories
or approved by FM or similar national insurance organizations. Fire doors, frames, and hardware shall be installed with label attached in accordance with NFPA 80.

DOE6430.1A Section 0800-2.2

Windows - Fire Protection - Where required by code, fire windows, frames, and hardware shall be either tested and listed by UL or similar nationally recognized testing laboratories or approved by FM or similar national insurance organizations. Such fire windows, frames, and hardware shall be installed with label attached in accordance with NFPA 80.

12.0 FIRE PROTECTION

12.2.3.3.1 Fire Barrier Penetrations

DOE6430.1A Section 0727, General

Firestopping shall comply with NFPA 101, Chapter 6.

Firestopping materials and assemblies shall be tested for their fire resistance and listed by UL or similar nationally accredited testing laboratories, or shall be listed for their fire resistance as approved by FM or similar national insurance organizations. Unrated and unapproved assemblies shall be tested and approved before being considered for use in a DOE facility.

Where fire-rated assemblies (walls, floors-ceilings, roof-ceilings) are either partially or fully penetrated by pipes, ducts, conduits or other such building elements, firestopping material shall be placed in and around the penetrations to maintain the fire resistance rating of the assembly.

RLID5480.7 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.

12.2.3.3.2 Fire Barrier Penetration by Raceways

DOE6430.1A Section 1605-2.1.1

Raceways that penetrate fire-assemblies shall be noncombustible. The complete installation shall be suitably sealed to maintain the established fire ratings as defined in UL Building Material Directory and UL 1479. Raceways shall be 1/2 inch minimum in diameter. Raceways embedded in concrete or masonry shall be 3/4 inch minimum and shall be adequate in number and capacity for the initial and projected facility requirements.

12.2.4.1 Facility Buildings

DOE/EH0135 FP.2

PERFORMANCE OBJECTIVE: All facilities onsite should provide adequate life safety provisions against the effects of fire.

CRITERIA

1. There is a program in place to ensure that facilities include NFPA 101 "Life Safety Code," requirements and conformance is verified by periodic field inspections.
2. Where strict code compliance is not feasible, as in some containment structures, alternative protection is provided in the form of personnel limitations, added control of combustibles, superior protection and/or construction, and strong management control (added inspection/maintenance, etc.).
3. Security considerations do not jeopardize life safety provisions.

DOE5480.7A 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.

12.0 FIRE PROTECTION

12.2.4.1.1 Exit and Emergency Lighting

DOE6430.1A Section 1655-1

Exit and emergency lighting systems shall comply with NFPA 101 and NFPA 110.

12.2.4.1.2 Life Safety for Laboratories

DOE6430.1A Section 0110-99.0.4(2)

A minimum number of entrances shall be provided for security areas. However, exists shall comply with NFPA 101. Some exits shall be provided for emergency use only, and equipped with alarm devices and seals. At least two exits shall be provided in rooms where hazardous materials are handled.

12.2.4.1.3 Egress

DOE6430.1A Section 0110-99.0.4(3)

In those areas where an accidental breach of a primary confinement system could expose personnel to radioactive material, a distance of 75 feet as measured by the method in the NFPA 101 shall be the maximum travel distance to ensure that personnel can exit through the next confinement.etc.

12.2.4.1.4 Corridor Widths

DOE6430.1A Section 0110-99.0.4(12)

Corridor width(s) can be a controlling factor in the overall building size, and corridors shall be no wider than required for facility functions. All Corridors and door openings, shall meet NFPA 101 or more stringent requirements based on the hazards of materials to be handled or operations to be performed, as established by the cognizant DOE health and safety authority. The size and arrangement of interior corridors shall accommodate the following:

- Personnel traffic flow patterns
- Safety of building occupants
- Movement of equipment (including initial equipment installations, facility operations and future replacement or removal)
- Ultimate decontamination and decommissioning of the facility including equipment required during decontamination.

12.2.4.1.5 Door Encroachment

DOE6430.1A Section 0110-99.04(13)

Where room doors open into corridors, frames shall be recessed to prevent the open doors from encroaching on clear corridor spaces.

12.2.4.1.6 Security Areas

DOE6430.1A Section 0800-1.3(4)

Doors that serve as exits from security areas shall comply with NFPA 101, Chapter 5, and with DOE security requirements, except the use of panic hardware on doors from security area shall be limited to assembly, educational, and hazardous occupancy classifications of UBC as determined by the cognizant DOE authority.

12.0 FIRE PROTECTION

12.2.4.1.7 Zoning for Automatic Control

DOE6430.1A Section 1595-2

Zoning for automatic control of space temperatures, static pressures, humidities, ventilation, smoke and fire detection, security and lighting shall satisfy health and safety requirements as indicated in DOE project criteria, NFPA 101, space operational and occupancy requirements, and zoning exposure with relation to building size, orientation and configuration, etc.

12.2.4.1.8 Life Safety in Hazardous Areas

DOE6430.1A Section 0110-6.4

Hazardous Areas - When exemptions are granted to specific DOE fire protection standards for reasons unique to DOE facilities, as in the case of some containment structures, fire protection shall be provided so as to assure the life safety of facility occupants as required by the cognizant DOE fire protection authority.

DOE6430.1A Section 0110-6.4[3]

The design of hazardous areas shall facilitate access by emergency personnel from the exterior and, at the same time, shall maintain any required confinement or containment using air locks or other features.

12.2.5.1 Improved Risk Level of Protection or Higher Standard of Protection

DOE5480.7A 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 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

DOE6430.1A Section 0110-6.2[2]

As part of determining the "improved risk" level, the analysis shall address those conditions in a facility where:

Large or unusual fire potential exists.
There are special life-safety hazards.
Toxic chemicals or biological agents exist.
The consequences of a fire include radioactive contamination of the facility, the site, or the public environment.
National security is adversely affected by fire.

DOE6430.1A Section 1530-2.1

Improved Risk Concept for Fire Protection Systems - Fire protection design shall incorporate an "improved risk" level of fire protection as directed in DOE Order 5480.7 as well as Section 0110-5, Health and Safety.

DOE6430.1A Section 1530-2.2

Vital Programs - Fire protection systems for vital programs shall incorporate a "higher standard of protection" than the "improved risk" level as directed by DOE Order 5480.7.

DOE6430.1A Section 1530-2.3.1

Maximum Possible Fire Loss - The "improved risk" level of protection requires that the "maximum possible fire loss" shall be the basis for determining the need to provide automatic fire suppression systems and for additional fire protection systems and features. "Maximum possible

12.0 FIRE PROTECTION

fire loss" is defined in DOE Order 5480.7, Criteria I through V as discussed in DOE Order 5480.7 correspond with Section 1530.2.3.2, Criterion I, through Section 1530.2.3.6,
Criterion V. The application of these criteria shall be considered by an experienced fire protection engineer.

12.2.6 Decommissioning Planning

RLID5480.7 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.

12.2.7 Construction

RLID5480.7 Section 8.4.a

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.

RLID5480.7 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.

RLID5480.7 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.

12.3.1 Fire Alarm Systems

DOE5480.7A 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.

12.0 FIRE PROTECTION

12.3.1.1 Fire Detection and Alarm Systems Design, Installation, Inspection, and Testing

DOE6430.1A Section 1530-8.1

Fire Detection and Alarm Systems - All fire detection and alarm devices shall have UL-listed components or be FM-approved. Devices and systems shall comply with NFPA 71, NFPA 72A, NFPA 72B, NFPA 72C, NFPA 72D, NFPA 72E, NFPA 72F, NFPA 72G, and NFPA 72H as applicable.

12.3.1.2 Fire Alarm System Features

DOE6430.1A Section 1530-8.2.1

Fire alarm systems shall have the following basic features:

Transmission of signals to the DOE facility fire department alarm centerand other constantly attended locations in accordance with the appropriate NFPA Signaling Systems Standard.

Local alarms for the building or zone in alarm.

Trouble signals as required by the appropriate NFPA Signalling Systems Standard.

Emergency battery backup for system operation.

Electric supervision of all circuits as required by the appropriate NFPA standard.

Supervisory devices for all critical functions (valve position switches, water level, temperature).

Capability of annunciating at least three separate conditions: 1) a fire alarm, 2) a supervisory alarm, and 3) a trouble signal indicating a fault in either of the first two. Annunciation of each condition shall be separate and distinct from the other two.

12.3.1.3 Compatibility of Alarm Systems

DOE6430.1A Section 1530-8.2.1[2]

Fire alarm systems for new DOE buildings shall be compatible with those for the DOE complex where the new building is to be located.

12.3.1.4 Fire Watch and Alarm Systems

DOE6430.1A Section 1530-8.2.2

Alarm Actuating Devices -

Alarms that respond to flow of water shall be provided wherever a sprinkler system is installed and shall comply with requirements of the NFPA standard for the type of signaling system used.

A manual fire notification method such as manual fire alarm boxes shall be provided and located in accordance with the appropriate NFPA standard.

Combined watch reporting and fire alarm systems, if used, shall be in accordance with the appropriate NFPA standard.

12.3.1.5 Underground Cables for Alarm Systems

DOE6430.1A Section 1670-2

Fire alarm and supervisory systems shall comply with NFPA 71, NFPA 72A, NFPA 72B, NFPA 72C, NFPA 72D, NFPA 72E, NFPA 72F, NFPA 72G, NFPA 72H, NFPA 1221, and ANSI C2 as appropriate for the location. Outside cable plant for the alarm and supervisory systems shall comply with the standards for telephone cable plant. In the joint use of poles for electric power distribution and for supporting fire alarm and telephone cables, separate fire alarm cable shall be placed below the telephone cable.

Fire alarm cables installed in underground ducts shall be distinctively marked within manholes and handholes that are shared with other communication cables and shall be kept physical separated from all power conductors.

Exterior fire alarm pull boxes and emergency-reporting telephones shall be installed in weatherproof housings manufactured specifically for the

12.0 FIRE PROTECTION

mechanism.

12.3.2.1 Automatic Fire Detectors Design and Installation

DOE6430.1A Section 1530-8.3.1

Automatic Fire Detection Systems - Automatic detection systems may be used to supplement or to actuate extinguishing systems. Automatic fire detectors
shall comply with NFPA 72E. Detector spacing shall be in accordance with NFPA 72E, Appendices A, B, and C.

DOE6430.1A Section 1530-8.3.3

Flame-Actuated Detectors - Flame-actuated detectors are appropriate when rapid detection is of prime importance in high hazard areas, such as:

Fuel-loading platforms.

Industrial process areas.

Hyperbaric chambers.

High ceiling areas.

Atmospheres where explosions or very rapid fires may occur. Since this type of device must "see" the flame to operate, the number of devices and their aiming must be carefully engineered. False trips from extraneous radiation sources are also possible. For the above reasons use of this type of device shall require coordination among the fire protection engineer, DOE project manager, and the equipment manufacturer.

DOE6430.1A Section 1530-8.3.4

Smoke Detectors - Smoke detectors shall be installed in all areas where required by the appropriate NFPA standard or by the cognizant DOE fire protection authority. Smoke detectors shall be of a type operating on one of the principles described in NFPA 72E. A mixture of detector types may be appropriate. Location and required spacing of smoke detectors shall be determined by the methods of NFPA 72E and its Appendix C. Spacing shall be based on threshold fire size, fire growth rate, and ceiling height as described in these standards.

DOE6430.1A Section 1660-99.0.2

A protection system is a system that initiates corrective action, e.g., fire detection/Halon.

The protection system shall provide automatic initiation of protective actions that require rapid response and automatic control of interlocks that prevent unsafe operator action.

The protection system shall be designed to sense potentially hazardous conditions and to initiate actions to ensure that specific acceptable design limits are not exceeded as a result of anticipated operational occurrences.

12.4 Fire Hazard Analysis

DOE5480.7A 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 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)

12.0 FIRE PROTECTION

(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.

12.4 Fire Hazard Analysis

RLID5480.7 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 (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 preform 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 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 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.

12.0 FIRE PROTECTION

(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 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.

12.5 Fire Prevention (Building Design)

DOE/EV-0043 101

This standard applies to all portable or relocatable structures including trailers, (hereafter referred to as portable structure) in a single fire area where any one of the following conditions exists:

- o Creates a life hazard.
- o Endangers the public or environment.
- o Replacement value exceeds $250,000. (Structure and Contents)
- o Is vital to a DOE program.

DOE6430.1A Section 0110-6.1

Fire Protection - General - Facilities shall comply with the following:
DOE Order 5480.4 Attachment 2, Section 2.c

12.0 FIRE PROTECTION

DOE Order 5480.7
Section 1530, Fire Protection
Facilities shall also comply with 29 CFR 1926 and 29 CFR 1910. Except as requires by other sections of these criteria, NFPA 101 shall apply where 29 CFR 1926 and 29 CFR 1910 does not apply or where NFPA 101 exceeds the requirements of 29 CFR 1926 and 29 CFR 1910.

DOE6430.1A Section 0110-6.1[2]

Definitions, fire resistance ratings, and types of construction shall be as contained in the UBC. Any materials with unusual fire characteristics, such as urethane foams, and any materials that develop significant quantities of toxic or harmful products of combustion, shall not be used as interior finishes or other interior applications without the approval of the cognizant DOE fire protection authority. The use of foam plastics in construction shall be prohibited unless it fully complies with FM 1-57.

12.5.1 Performance Objectives in the Design of DOE Facilities

DOE5480.7A 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.

DOE6430.1A Section 0110-6.2[3]

Special precautions for preventing the spread of fires, such as multiple fire suppression systems, rapid detection of incipient fires, confining fires, increased fire ratings of construction materials, and rapid-response fire departments shall be provided.

DOE6430.1A Section 0110-6.2[4]

A general fire-protection design analysis shall be made of each facility to ascertain and limit the cost of future damage repair and replacement of facilities and their contents from fire. The analysis shall be made using those parameters established in DOE Order 5480.7. The analysis shall determine the special fire prevention and protection features and controls deemed by the cognizant DOE fire protection authority to achieve a level of improved risk fire protection that limits damage to an acceptable level. The analysis shall be documented in report form in the facility project files and referenced by the SAR.

DOE6430.1A Section 0110-6.2[5]

Fire protection design analysis shall be done as soon as possible and included as a portion of the Title I Design Summary document required by DOE 4700.1.

WAC-173-303 Section 395(1)

Precautions for ignitable, reactive, or incompatible wastes.

(a) The owner or operator must take precautions to prevent accidental ignition or reaction of ignitable or reactive waste. This waste must be separated and protected from sources of ignition or reaction including, but not limited to, open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. While ignitable or reactive waste is being handled, the owner or operator must confine smoking and open flame to specially designated locations. "No smoking" signs must be conspicuously placed wherever there is a hazard from ignitable or reactive waste.

(b) Where specifically required by other sections of this chapter 173-303 WAC, the treatment, storage, or disposal of ignitable or reactive waste, and the mixture or commingling of incompatible wastes, or incompatible wastes and materials, must be conducted so that it does not:

(i) Generate extreme heat or pressure, fire or explosion, or violent reaction;

(ii) Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment;

(iii) Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions;

(iv) Damage the structural integrity of the facility or device containing the waste; or

(v) Through other like means, threaten human health or the environment.

12.0 FIRE PROTECTION

(c) When required to comply with (a) and (b) of this subsection, the owner or operator must document that compliance in the operating record required under WAC 173-303-380(l). This documentation may be based on references to published scientific or engineering literature, data from trial tests, waste analyses, or the results of the treatment of similar wastes by similar treatment processes and under similar operating conditions.

(d) At least yearly, the owner or operator shall inspect those areas of his facility where ignitable or reactive wastes are stored. This inspection shall be performed in the presence of a professional person who is familiar with the Uniform Fire Code, or in the presence of the local, state, or federal fire marshal. The owner or operator shall enter the following information in his inspection log or operating record as a result of this inspection:

(i) The date and time of the inspection;

(ii) The name of the professional inspector or fire marshal;

(iii) A notation of the observations made; and

(iv) Any remedial actions which were taken as a result of the inspection.

12.5.2 Exterior Fire Protection Systems and Features

DOE6430.1A Section 0110-6.4[4]

The design of the exteriors of facilities shall follow the recommendations of NFPA 80A. Facilities that are not separated as recommended by NFPA 80A shall have fire protection systems such as exterior sprinklers or barrier walls.

DOE6430.1A Section 0200-2(21)

Minimum fire separation between buildings (in accordance with NFPA 80A).

12.5.3 Fire Resistance for Materials and Construction

DOE6430.1A Section 0110-6.3[2]

Adjacent occupancies of noncompatible groups shall be separated by 2-hour, or better, fire-rated walls, floors, and ceilings as required by NFPA codes.

DOE6430.1A Section 0110-6.3[3]

Wall, floor and ceiling, and roof and ceiling assemblies shall be tested and rated for their fire resistance by UL or similar nationally accredited testing laboratories, or shall be listed for their fire resistance as approved by FM or similar national insurance organizations. Untested, unrated or unapproved assemblies shall be approved by the cognizant DOE fire protection authority before being considered for use in a facility.

DOE6430.1A Section 0110-99.0.6

Fire Resistance - Development of the DBF shall include consideration of conditions that may exist during normal operations and special situations (e.g., during periods of decontamination, renovation, modification, repair, and maintenance). The structural shell surrounding critical areas and their structure during the DBF under conditions of failure of any fire suppression system not designed as a safety class item. Fire resistance of this shell shall be attained by an integral part of the structure (concrete slabs, walls, beams, and columns) and not by composite assembly (membrane fireproofing). In no event shall the fire resistance rating be less than two hours under conditions of failure of any fire suppression system not designed as a safety class item. Penetrations in this shell shall incorporate, as a minimum, protection against DBF exposures unless greater protection is required by other sections of these criteria.

12.0 FIRE PROTECTION

12.5.4 Building Design for Work Stations on Process Areas

DOE6430.1A Section 1161-2

Non-combustible or fire resistant and corrosion-resistant materials shall be used for enclosures and, to the maximum extent practicable, for any required
radiation shielding. In no case shall the total combustible loading located in a fire area exceed the fire resistance rating of the structural envelope (see DOE 6430.1A,Section 0110-99.0.6, Fire Resistance). This shall be documented in a fire risk analysis performed according to a methodology approved by the DOE Fire Protection Authority. This analysis should include estimated fire area combustible loadings, ventilation parameters, room dimensions, maximum average gas temperature, fire duration, maximum average heat flux, and the calculational method used. Enclosures (except open-face hoods) shall be designed with the objectives of being leak-tight. In conjunction with their ventilation systems all enclosures shall be capable of maintaining confinement (i.e. negative pressure with respect to the surrounding operating area). Without their associated ventilation systems enclosures shall be designed with appropriate physical features to provide an essentially leak-tight confinement (except open-face hoods, which shall provide filtered confinement) for the contaminants they handle.

Enclosures specifications should include the following standardized features, where applicable:

Windows and mountings
Fire barriers and filter installation.

12.5.5.1 Interior Finish Materials

DOE6430.1A Section 0995

Wall Coverings shall conform to NFPA 101.

DOE6430.1A Section 1260-2

Furniture shall comply with NFPA 101, Chapter 31 (sections concerning furnishings, decorations, and treated finishes), and UBC Chapter 17 for folding, portable, and movable partitions.

RLID5480.7 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 pre square centimeter, when tested in accordance with ASTM E-648 (NFPA 253).

12.5.5.2 Interior Floor Coverings

DOE6430.1A Section 1260-4

Rugs and Mats shall comply as furnishings with NFPA 101, Chapter 31 (sections concerning furnishings, decorations and treated finishes), in all occupancy
classifications except those of storage and industrial.

Rugs and mats used in storage or industrial occupancies shall have a critical radiant flux not less than the following:

* 0.45 watts per square centimeter where there are no sprinklers complying with NFPA13;
* 0.22 watts per square centimeter where there are sprinklers complying with NFPA 13

12.0 FIRE PROTECTION

12.5.5.3 Control of Combustible Materials by Building Design

DOE6430.1A Section 0110-99.0.4(4)

The facility design shall provide space to accommodate all planned activities, operations, and maintenances (e.g., processing, research and development, scrap and waste handling, sample analysis, shipping and receiving and material staging required for equipment installation and modifications). The design shall minimize the hazard of handling flammable and other hazardous materials. In addition to the usual industrial safety features required in a nuclear facility, the design shall also include the following safety features as appropriate:

- Layout of the facility shall provide specific control and isolation, if possible, of quantities of flammable, toxic and explosive gases, chemicals, and other hazardous materials admitted to the facility.

12.5.5.4 Quantities of Stored Materials

DOE6430.1A Section 0110-99.0.4(8)

Suitable physical compartmentalization shall be provided, as determined from the safety analysis,to limit the quantities of stored materials in each compartment to safety levels; ensure the necessary access features and controls; and satisfy the loss limitation criteria in Section 0110-99.0.7, Loss Limitations.

12.5.5.5 Fire and Explosion Potential of the Materials

DOE6430.1A Section 1530-99.0[12]

The designers of the fire protection system shall consider the fire and explosion potential of the materials being processed and the solvents used during processing. In addition, the design shall include facility-specific fire protection systems to mitigate the damage from pyrophoric and other materials that are fire hazards, (e.g., magnesium, ion exchange resins, nitrate solvent and nitrate reduction reactions, and zirconium fuel element cladding hulls).

12.5.6 Telecommunications, Alarm, and ADP Centers and Radio Repeater Stations

DOE6430.1A Section 1530-99.8

Telecommunications, Alarm and ADP Centers and Radio Repeater Stations An automatic sprinkler system shall be provided in all centers where water
availability is adequate based on engineering analysis. Systems should normally be wet pipe with smoke detection. Other automatic suppression systems such as halogenated fire extinguishing agent systems or carbon dioxide systems shall be supplementary only.

DOE6430.1A Section 1530-99.8[2]

The fire protection systems shall comply with DOE/EP 0108 and NFPA 75. All sprinkler systems should be hydraulically designed for the appropriate water
density based on occupancy.

DOE6430.1A Section 1530-99.8[3]

Automatic fire detection systems shall be provided in all centers. Each system shall provide for automatic alarm transmission to local sounding devices and to the cognizant fire alarm center.

DOE6430.1A Section 1530-99.8[4]

The detection system shall perform the following functions:

Initiate an alarm to the building alarm system and to the local fire alarm control center.

Shut off electric power to computer-electronic data processing equipment in those areas where fire may operate sprinkler heads before manual power shutdown could be accomplished.

Activate the appropriate HVAC system control sequence to provide smoke evacuation. A manual reset shall be provided to reenergize the

interrupted electrical systems.

12.5.7.1 Ignition Source by Electrical Equipment

DOE6430.1A Section 1530-99.0[21]

Because of flammable or potentially flammable atmospheres, electrical installations in hazardous process locations shall be designed to preclude the introduction of any ignition source by the electrical equipment.

12.5.7.2 Listing Requirements for Electrical Materials and Equipment

DOE6430.1A Section 1605-1(2)

Electrical materials and equipment shall be UL or FM tested, with label attached, for the purpose intended, whenever such products are available. Where there are no UL of FM listed products of the type, testing and certification by another nationally recognized testing agency may be acceptable. Installation methods shall be in accordance with the manufacturer's instructions, with NFPA 70, and with other applicable requirements.

DOE6430.1A Section 1640-2.3

Interior service transformer installations shall comply with NFPA 70. The minimum number of transformers necessary to satisfy initial and projected facility loads and operational continuity, safety, and security requirements shall be used. Transformer protection and appurtenances shall comply with IEEE CC37.91. Transformer installation shall comply with FM 5-4/14-8

12.5.7.3 Conduits

DOE6430.1A Section 1605-2.1.4

Rigid steel conduit shall be used in locations classified as hazardous by NFPA 70.

12.5.7.5 Redundant Electric Circuits

DOE6430.1A Section 1630-1.3

Facilities designated by the cognizant DOE authority as critical shall be served by dedicated, redundant electric circuits. The two services shall be separated by a 4-hour fire-rated barrier and shall be served from separate sources. In lieu of providing two separate services, a single service supplied from a loop-type transmission or distribution system having sectionalizing features may be provided when the reliably of the single service proves adequate when considered in conformance with IEEE 399 and IEEE 493.

12.5.7.6 Primary, Auxiliary, Emergency, and Standby Power Systems

DOE6430.1A Section 110-99.8.1

A primary and auxiliary power source shall be provided for protective alarm systems. See DOE 6430.1A Division 16, Electrical, for power supply criteria

DOE6430.1A Section 1530-99.0[11]

An emergency source of electric power shall be provided to operate fire protection systems. Fire protection systems shall be capable of operating
during a normal power outage. The emergency power sources and the electrical distribution circuits shall have independence and testability to ensure
performance of their safety functions assuming any single failure.

DOE6430.1A Section 1640-3.2

Normal primary power for protective alarm and communications systems shall come directly from the on-site power distribution system or, in the case of isolated facilities, shall come directly from the public utility. Where several primary power sources are available, the most reliable source shall be used.

12.0 FIRE PROTECTION

DOE6430.1A Section 1640-3.3

Standby or emergency power supplies for security, communications, and alarm systems shall be provided in accordance with DOE 6430.1A Section 1660, Special Systems.

DOE6430.1A Section 1660-1(1)

Standby and emergency systems shall serve loads set forth in NFPA 110.

DOE6430.1A Section 1660-1(4)

Emergency power shall be provided for protective alarm and communications systems as dictated by the system requirements. Switchover to emergency power shall be automatic on failure of the primary power source and shall be indicated on an annunciator panel. The annunciator shall be located in an occupied area and shall indicate any problems with the emergency system. Definition of "emergency systems", " legally required standby systems", and "operational standby systems" shall be in accordance with NFPA 70.

DOE6430.1A Section 1660-2

Emergency power systems shall be capable of maintaining full operation of emergency loads for the full time period specified by the cognizant DOE authority (nominally, a minimum of 24 hours). Such power sources shall have the necessary built-in features to facilitate operation testing on a periodic basis to verify their readiness.

Emergency power systems shall comply with NFPA 37, NFPA 70, NFPA 101, NFPA110, and IEEE 446.

12.5.8.1 Ductwork and Air Ventilation Systems

DOE5480.7A 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.

DOE6430.1A Section 1550-2.5.6

Ductwork, accessories, and support systems shall be designed to comply with the following: NFPA 45

Ductwork shall also be designed to comply with NFPA 90A including specification and installation of smoke and fire dampers at fire wall penetrations and smoke pressurization/containment dampers as required for smoke pressurization/evacuation systems. Fire dampers shall not be used on exhaust system ducting if it is required to maintain confinement of hazardous materials during and after a fire event.

Exhaust ductwork shall comply with NFPA 91. Ductwork for kitchen exhaust shall comply with NFPA 96.

DOE6430.1A Section 1595-6.5[2]

All air handling systems shall be provided with the smoke and fire protection controls require by NFPA 101.

DOE6430.1A Section 1595-6.5[3]

All supply, return, relief, and exhaust air ventilation systems shall have interlock controls that interface with fire and smoke detection system controls and either turn off or selectively operate fans and dampers to prevent the spread of smoke and fire throughout the building. These controls shall comply with NFPA 90A.

DOE6430.1A Section 1595-6.5[4]

Special exhaust systems shall be designed to include fire and smoke safety controls as required by NFPA 91. Kitchen exhaust ductwork systems shall be designed to include all fire and smoke safety controls as required by NFPA 91.

12.0 FIRE PROTECTION

12.5.8.2 Smoke Pressurization and Evacuation Systems

DOE6430.1A Section 1595-6.5

Control of Air Handling Systems - Fire and Smoke Detection and Protection
Controls - Engineered smoke pressurization and evacuation systems shall comply with the following:

NFPA 90A
NFPA 72E
ASHRAE Manual, Design of Smoke Control Systems for Buildings
ASHRAE Systems Handbook

12.5.8.3 Confinement Systems Function During the DBF

DOE6430.1A Section 1530-99.0[8]

Confinement systems, particularly the building structural shell and its associated ventilation system, shall be designed with the capability of retaining the confinement function during the DBF.

12.5.8.4 Confinement Systems and Fire Protection

DOE6430.1A Section 1530-99.0[18]

To protect the integrity of process confinement systems, fire protection systems shall include the following features:

Automatic and redundant fire detection devices.

A fire-extinguishing system to rapidly remove heat produced by fire to prevent or minimize the Pressurization of a process confinement and to rapidly extinguish a fire to minimize the loading of ventilation system filters with combustion products.

The introduction of the extinguishing agent in a way that does not result in over-pressurization of the confinement barriers.

12.5.8.5 Design Features for Lower Flammability Limit

DOE6430.1A Section 1530-99.0[13]

When the process uses or produces combustible gases or vapors, the design shall include features such as inert gas purging, premixing hydrogen to a
nonflammable percent with inert gas, and increasing the air flow within process confinement barriers to provide the dilution required to maintain the
concentration of gases or vapors below the lower limit for flammability.

12.5.8.6 HEPA Filters

DOE6430.1A Section 1161-4(2)

...The design of the enclosure ventilation flow pattern shall minimize the spread of fire, and fire screens shall be provided where applicable.

DOE6430.1A Section 1550-2.5.5(9)

Heating, Ventilating and Air-Conditioning Systems - Air Cleansing Devices - Fire Protection of HEPA Filter Assemblies - In providing fire protection for the HEPA filters, the design shall separate prefilters or fire screens equipped with water spray sufficiently from the EPA filters to restrict impingement of moisture on the HEPA filters. Under conditions of limited separation, moisture eliminators or other means of reducing entrained moisture shall be provided. Moisture eliminators may be omitted where system design provided sufficient filter redundancy to ensure continued effluent filtration in the event of fire within any portion of the system. The HEPA filter fire protection system shall be activated in a manner consistent with the fire protection system in the room or building in which the filters are located and as directed by the cognizant DOE fire protection authority.

12.0 FIRE PROTECTION

12.5.9 Lightning Protection

DOE6430.1A Section 1630-5

Lighting protection systems shall comply with NFPA 78. Lightning protection systems shall be considered for buildings containing facilities for the use, processing, and storage of radioactive, explosive and similarly hazardous materials; for buildings over 50 feet in height; and for buildings containing valuable equipment. A risk assessment using the guide in Appendix I of NFPA 78 shall be made of these buildings to determine the risk of loss due to lightning.

12.5.10 Seismic Requirements

DOE5480.7A 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.

12.5.11 Safety Class Equipment

DOE5480.7A 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.

DOE6430.1A Section 1660-99.0.1(4)

Redundant safety class electric systems shall be physically protected or separated to prevent a common external event from causing a failure of the redundant systems. IEEE 379 and IEEE 384 shall be used as redundancy and separation criteria.

DOE6430.1A Section 1660-99.0.5

The design of protection systems and safety class instrumentation and control systems shall provide for the periodic in-place testing and calibration of instrument channels and interlocks. The design shall allow periodic testing of protective functions to determine whether failure or loss of redundancy may have occurred.

12.6.1 Fire Department

DOE5480.7A Section 9.b.(7)

Fire Department - A fully staffed, trained, and equipped fire department brigade shall service all DOE facilities, except as determined by the PSO. (Refer to the fire protection positions on minimal staffing levels in the DOE Fire Protection Resource Manual.) DOE or Contractor-operated organizations with the responsibility for providing fire protection for DOE property may enter into mutual aid agreements with other fire departments in accordance with Public Law 46 (Title 42 USC Section 1856).

RLID5480.7 Section 6.3

The Hanford Fire Department shall provide fire suppression, rescue, emergency medical and ambulance services, and hazardous material response, that are capable of dealing with the terminating emergency situations, which could threaten the operations, employees, environment, or property on the Hanford Site. The Hanford Fire Department shall also:

a. Comply with applicable fire department provisions of DOE 5480.4 and DOE 5480.7A.

b. Provide emergency response support, as required by agreements or contracts, to other entities or agencies, on the Hanford Site.

c. Maintain mutual aid agreements with surrounding area fire districts.

d. Develop, administer, and enforce the Fire Prevention Program for the Hanford Site, as contained in the Authority, Responsibilities, and Duties

12.0 FIRE PROTECTION

of the Hanford Fire Marshal Attachment of the Fire Prevention Program description contained in the Hanford Chapter of the DOE Fire Protection Resource Manual. The Fire Prevention Inspection Program shall apply to all site activities, including operations, demolition, and construction.

e. Provide appropriate sitewide fire protection system inspection, testing, and maintenance for fire alarm and fire suppression systems.

f. Perform self-contained breathing apparatus maintenance.

g. Maintain confined space entry and other emergency rescue readiness, as required by 29 CFR 1910.

h. Develop and maintain pre-fire plans for all major Hanford facilities and operations.

i. Be the designated hazardous materials incident command agency for the Hanford Site.

j. Act as the lead emergency response organization and provide incident command, as required by DOE 5480.4 for fire suppression, emergency medical and ambulance service, special emergency rescue, and hazardous material events for Hanford Sit operations.

k. Provide fire protection representation at the Hanford Fire Protection Forum meeting, as described in the Hanford Fire Protection Forum Charter.

l. Attend and provide representation at the monthly program interface meetings with the RL fire protection representative.

12.7.1 Fire Protection Investigation and Reporting

RLID5480.7 Section 8.8

Fire investigations and reports shall be performed and prepared, in accordance with DOE 5000.3B and DOE 5485.1.

12.7.1.1 Design Assessment

DOE5480.7A Section 9.a(2)

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:

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.

DOE6430.1A Section 0110-6.2

Fire Protection Design Analysis - A special fire protection design analysis shall be made of each facility vital to DOE mission accomplishment. The analysis shall use time parameters established in accordance with DOE Order 5480.7. The analysis shall identify the special fire prevention

12.0 FIRE PROTECTION

and protection features and controls deemed by the cognizant DOE fire protection authority to achieve a level of fire protection for vital facilities and programs that meets or exceeds the "improved risk" level.

DOE6430.1A Section 1530-99.0

Special Facilities - Nonreactor Nuclear Facilities - An assessment shall be made early in the design or modification to determine the facility structures, systems, and components that shall be protected against the effects of a DBF and explosion. A fire protection engineer or person knowledgeable in applying the principles of fire protection shall develop the fire protection system. To maximize the protection against fire, the system shall contain an appropriate integration of fire prevention, detection, and suppression features.

12.7.1.2 Inspection, Testing and Maintenance

DOE5480.7A 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.

RLID5480.7 Section 8.2.b

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.

12.7.3 Control of Fire Protection Impairments

DOE5480.7A 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.

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13.0 PACKAGING AND TRANSPORTATION

13.0 PACKAGING AND TRANSPORTATION

13.2 Packaging and Transportation Operations

DOE1540.1A Chapter I, Section 4.a

COMPLIANCE WITH TRANSPORTATION LAWS OR REGULATIONS.
General Requirements. DOE shipments shall comply with all laws and regulations notwithstanding the Department's national security exemption stated in Chapter II, paragraph 1c of this Order. Requests for waivers may be submitted to the cognizant regulatory authority pursuant to a determination by the head of the field element of the need of such waiver.

13.2.1 Packaging

40CFR 262 Part 30

Packaging.

Before transporting hazardous waste or offering hazardous waste for transportation off-site, a generator must package the waste in accordance with the applicable Department of Transportation regulations on packaging under 49 CFR Parts 173, 178, and 179.

49CFR 173 Part 24

(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 (including U.N. standard packagings), 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) DOT specification and U.N. standard packagings. For DOT specification packagings (including U.N. standard packagings), conformance to the applicable specifications in parts 178 and 179 of this subchapter is required in all details. For performance-oriented packagings covered by subpart L of part 178 of this subchapter, each packaging must be capable of meeting the performance test requirements specified in subpart M of part 178 of this subchapter for the applicable packing group shown in Column 5 of the 172.101 Table.

13.0 PACKAGING AND TRANSPORTATION

(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-

(A) 18øC (64øF) for 180 days in accordance with Test Method 1 in appendix B of this part;

(B) 50øC (122øF) for 28 days in accordance with Test Method 2 in appendix B of this part; or

(C) 60øC (140øF) 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 or poisonous 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.

13.0 PACKAGING AND TRANSPORTATION

(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;

(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.

DOE1540.2 Chapter X, Section 2.b

Requirements
Users shall ensure that packaging constructed in accordance with the DOT specifications meet the current requirements.

(1) Packaging procured from commercial sources must be certified by the manufacturer that the packaging meets all applicable specifications.
(2) It is the responsibility of the user to ensure that adequate documentation is developed and maintained for new specification packaging constructed for their use. All documentation should be available for audit.

WAC-173-303 Section 190(1)

Packaging. The generator shall package all dangerous waste for transport in accordance with United States DOT regulations on packaging, 49 CFR Parts 173, 178, and 179.

13.2.1.1 Type A Packaging

49CFR 173 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) U.S. Department of Transportation (DOT) Specification 7A (178.350 of this subchapter) Type A general packaging. Each shipper 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, a 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. Specification 7A packagings designed in accordance with the requirements of 178.350 in effect on June 30, 1983, and constructed prior to July 1, 1985, may continue to be used. Packagings either designed or constructed after June 30, 1985, must meet the requirements of 178.350 applicable at the time of their design or construction.

(b) DOT Specification 55 metal-encased shielded packaging constructed before April 1, 1975. Such packaging constructed after March 31, 1975 is not authorized unless it is requalified under DOT Specification 7A. Each packaging designed for liquids must also meet the requirements of 173.412 (m) and (n). Use of this packaging as DOT Specification 55 is not authorized after June 30, 1985.

(c) Any Type B, B(U) or B(M) packaging pursuant to 173.416.

(d) Any foreign made packaging that bears the marking ``Type A'' and which was used for the import of radioactive materials. Such packagings may be subsequently used for domestic and export shipments of radioactive materials. These packagings shall conform with requirements of the country of origin (as indicated by the packaging marking) applicable to Type A packagings. (The information collection requirements contained in paragraph (a) were approved by the Office of Management and Budget under control number 2137 0533)

13.2.1.2 Type B Packaging

49CFR 173 Part 413

Requirements for Type B packages.

Each Type B(U) or Type B(M) package must be designed and constructed to meet the applicable requirements in 10 CFR part 71.

49CFR 173 Part 471

Requirements for U.S. Nuclear Regulatory Commission approved packages.

In addition to the applicable requirements of the U.S. Nuclear Regulatory Commission (USNRC) and parts 171 -177 of this subchapter, any shipper of a Type B, Type B(U), Type B(M), or fissile material package that has been approved by the USNRC in accordance with 10 CFR part 71 shall also comply with the following requirements:

(a) The shipper shall be registered with the USNRC as a party to the approval, and the shipment must be made in compliance with the terms of the approval;

(b) The outside of each package shall be durably and legibly marked with the package identification marking indicated in the USNRC approval;

(c) Each shipping paper related to the shipment of the package shall bear the package identification marking indicated in the USNRC approval;

(d) Before the first export shipment of the package, the shipper shall obtain a U.S. Competent Authority Certificate for that package design or if one has already been issued, the shipper shall register with the U.S. Competent Authority as a user of the certificate. Upon registration as a user of the certificate the shipper will be furnished with a copy of it. The shipper shall then submit a copy of the U.S. Competent Authority Certificate applying to that package design to the national competent authority of each country into or through which the package will be transported, unless a copy has already been furnished;

(e) [Reserved]

(f) Each request for a U.S. Competent Authority Certificate as required by the IAEA regulations shall be submitted in writing to the address set forth in paragraph (e) of this section. The request shall be in duplicate and include copies of the applicable USNRC approval and a reproducible drawing showing the make-up of the package. Each request is considered in the order in which it is received. To allow sufficient consideration by the Associate Administrator for Hazardous Materials Safety, requests should be received at least 45 days before the requested effective date; and

(g) Import and export shipments may be made in accordance with 171.12 of this subchapter.(The information collection requirements contained in paragraph (a) were approved by the Office of Management and Budget under control number 2137 0512. The information collection requirements contained in paragraph (d) were approved under control number 2137 0515.)

DOE1540.2 Chapter I, Section 3.(a)(b)(c)(d)

NRC-Approved Packaging.

(1) DOE contractors may use any NRC-certified packaging provided:

(a) The packaging is used in accordance with the limitations specified in the certificate of compliance.

(b) The use of the packaging is not prohibited by DOE 5480.3.

13.0 PACKAGING AND TRANSPORTATION

(c) The contractor complies with the requirements of page V-1, paragraph 2a.
(d) The DOE is registered as a user, and the contractor possesses a copy of the latest NRC Certificate of Compliance.

(2) All requests for NRC Certificates of Compliance by operations offices and/or their contractors shall be directed to DP-4 in accordance with Chapter V. If any of the above organizations contract with an outside contractor to develop and obtain an NRC-certified packaging, the request for the certificate of compliance need not be coordinated through DP-4 provided that the operations office or DOE contractor does not participate in obtaining the NRC certification. However, DP-4 should be furnished preliminary design information so as to avoid any duplication of effort and for distribution to other Departmental Elements having a potential interest. All requests for the registering Departmental Elements as a user of a NRC-certified packaging must be through DP-4.

(3) Each operations office shall ensure that their contractors establish and maintain an appropriate quality assurance and maintenance program to ensure that NRC-certified packagings in use continue to meet the provisions of the certification and SARP. Each operations office will be evaluated on its contractor's transportation quality assurance and maintenance program as part of the Headquarters packaging and transportation appraisal.

DOE1540.2 Chapter V, Section 2.a

Requirements for Use of NRC-Certified Packagings. Packaging for which the NRC has issued a certificate of compliance may be used by DOE and DOE contractors without further review and certification, provided that the Department is registered as a user or the certificate is issued to DOE, and that all of the conditions of the NRC certificate are met, and the use of the packaging is not prohibited by DOE 5480.3. Specifically, the using contractor shall:

(1) Possess a copy of the latest NRC Certificate of Compliance;
(2) Possess a copy of the operating and maintenance instructions asspecified in the license application for the packaging; and
(3) Have an established quality assurance program equivalent to 10 CFR Part 71, subpart H.

DOE5480.3 Section 7.b(1)

Special Packaging Requirements for Plutonium and Plutonium Bearing Wastes. (in addition to other packaging requirements in this Order).
(1) Solid plutonium or plutonium bearing wastes in greater than A2 quantities for normal form or greater than A1 quantities for special form must be packaged in accordance with a specified DOE Certificate of Compliance, an NRC Certificate of Compliance, an DOT exempt packaging system, or a DOT Specification package.

13.2.1.3 Low Specific Activity Packaging

49CFR 173 Part 425

Transport requirements for low specific activity (LSA) radioactive materials.

In addition to other applicable requirements specified in this subchapter, low specific activity (LSA) materials shall be transported in accordance with paragraph (a) of this section, or if transported as exclusive-use may be transported in accordance with paragraph (b) or (c) of this section.
(a) DOT Specification 7A (178.350 of this subchapter) Type A package. The requirements of 173.412 (a), (b), (d), and (n) do not apply.
(b) Packaged shipments of LSA material consigned as exclusive use shall either be in accordance with paragraph (a) of this section or shall comply with the following in which case they are excepted from specification packaging, marking and labeling:
(1) Materials must be packaged in strong, tight packages so that there will be no leakage of radioactive material under conditions normally incident to transportation.
(2) Packages must not have any significant removable surface contamination (see 173.443).
(3) External radiation levels must comply with 173.441.
(4) Shipments must be loaded by consignor and unloaded by consignee from the conveyance or freight contained in which originally loaded.
(5) There must be no loose radioactive material in the conveyance.
(6) Shipment must be braced so as to prevent shifting of lading under conditions normally incident to transportation.
(7) Except for shipments of unconcentrated uranium or thorium ores, the transport vehicle must be placarded with the placards prescribed in accordance with subpart F of part 172 of this subchapter, as appropriate.

13.0 PACKAGING AND TRANSPORTATION

(8) The exterior of each package must be stenciled or otherwise marked ``Radioactive-LSA''. Packages, with a capacity of 110 gallons or less, that contain a hazardous substance, must be stenciled or otherwise marked with the letters ``RQ'' in association with the above description.

(9) Specific instructions for maintenance of exclusive use shipment controls must be provided by the shipper to the carrier. Such instructions must be included with the shipping paper information.

(10) Transportation by aircraft is prohibited.

(c) Unpackaged (bulk) shipments of LSA materials shall be transported only in exclusive use closed transport vehicles and shall comply with the following:

(1) Authorized materials are limited to the following:

(i) Uranium or thorium ores and physical or chemical concentrates of those ores.

(ii) Uranium metal or natural thorium metal, or alloys of these materials.

(iii) Materials of low radioactive concentration, if the average estimated radioactivity concentration does not exceed 0.001 millicurie per gram and the contribution from materials with an A2 value (see 173.435) of less than 0.05 curie does not exceed one percent of the total radioactivity.

(iv) Objects of nonradioactive material externally contaminated with radioactive material, if the radioactive material is not readily dispersible and the surface contamination, when averaged over one square meter, does not exceed 0.0001 millicurie per square centimeter of radionuclides for which the A2 value is less than 0.05 or 0.001 millicurie per square centimeter of other radionuclides. Such objects must be suitably wrapped or enclosed.

(2) Bulk liquids must be transported in the following: (i) Specification 103CW, 111A60W7 (179.200, 179.201, 179.202 of this subchapter) tank cars. Bottom openings in tanks prohibited.

(ii) Specification MC 310, MC 311, MC 312, or MC 331 (178.343 or 178.337 of this subchapter) cargo tanks. Authorized only where the radioactivity concentration does not exceed 10 percent of the specified low specific activity levels (see 173.403(n)). The requirements of 173.412(n) do not apply to these cargo tanks. Bottom fittings and valves are not authorized. Trailer-on-flat-car service is not authorized.

(3) External radiation levels must comply with 173.441(b).

(4) Shipments must be loaded by the consignor, and unloaded by the consignee from the conveyance or freight container in which originally loaded.

(5) Except for shipments of unconcentrated uranium or thorium ores, the transport vehicle must be placarded with the placards prescribed in subpart F of part 172 of this subchapter, as appropriate.

(6) There must be no leakage of radioactive materials from the vehicle.

(7) Specific instructions for maintenance of exclusive use shipment controls must be provided by the shipper to the carrier. Such instructions must be included with the shipping paper information.

(8) Transportation by aircraft is prohibited.

(d) Except for transportation by aircraft, low specific activity material that conforms with the provisions specified in 10 CFR 20.306 is excepted from all requirements of this subchapter pertaining to 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.

13.2.1.4 Limited Quantity Packaging

49CFR 173 Part 421

Limited quantities of radioactive materials.

Radioactive materials whose activity per package does not exceed the limits specified in 173.423 are excepted from the specification packaging, shipping paper and certification, marking, and labeling requirements of this subchapter and requirements of this subpart if:

(a) The materials are packaged in strong, tight packages that will not leak any of the radioactive materials during conditions normally incident to transportation;

(b) The radiation level at any point on the external surface of the package does not exceed 0.5 millirem per hour;

(c) The nonfixed (removable) radioactive surface contamination on the external surface of the package does not exceed the limits specified in 173.443(a);

(d) The outside of the inner packaging or if there is no inner packaging, the outside of the packaging itself bears the marking` `Radioactive'';

(e) Except as provided in 173.424, the package does not contain more than 15 grams of uranium-235; and

(f) The material is otherwise prepared for shipment as specified in 173.421 1.

13.0 PACKAGING AND TRANSPORTATION

49CFR 173 Part 421(2)(a)

Requirements for multiple hazard limited quantity radioactive materials.
Except as provided in paragraph (b) of this section or in 173.4 of this subchapter, when a limited quantity Class 7 material meets the definition of another hazard class or division, it shall be:
(1) Classed for the additional hazard;
(2) Packaged to conform with the requirements specified in 173.421 (a) through (e) or 173.422 (a) through (g), as appropriate; and
(3) Offered for transportation in accordance with the requirements applicable to the hazard for which it is classed.

49CFR 173 Part 421(2)(b)

When a limited quantity Class 7 material meets the definition of Class 9 or is a combustible liquid in a non-bulk packaging, it shall be:
(1) Classed as a Class 7 material if:
(i) The material is not a hazardous waste or hazardous substance; and
(ii) The material is offered for transportation in a mode to which requirements of this subchapter pertaining to the specific material do not apply;
(2) Classed combustible liquid or Class 9, as appropriate, if:
(i) The material is a hazardous waste or hazardous substance; or
(ii) The material is offered for transportation in a mode to which requirements of this subchapter pertaining to the specific material do apply;
(3) Packaged to conform with requirements specified in 173.421 (a) through (e) or 173.422 (a) through (g), as appropriate; and
(4) Offered for transportation in accordance with requirements applicable to the hazard for which it is classed.

49CFR 173 Part 421(2)(c)

A limited quantity Class 7 material which is classed other than Class 7 under the provisions of paragraph (a) or (b) of this section is excepted from the requirements of 173.421 1(a), 172.203(d), and 172.204(c)(4) of this subchapter if the entry ``Limited quantity radioactive material'' appears on the shipping paper in association with the basic description.

49CFR 173 Part 421-1

Additional requirements for excepted packages containing Class 7 (radioactive) materials.

(a) Excepted packages prepared for shipment under the provisions of 173.421, 173.422, 173.424, or 173.427 of this subpart 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 the statement "This package conforms to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910; 49 CFR 173.422 for radioactive for radioactive material, excepted package--articles manufactured from natural or depleted uranium or natural thorium, UN2910; or 49 CFR 173.427 for radioactive material, excepted package--empty packages, UN2908", as appropriate.

(b) An excepted radioactive material classed radioactive material and prepared for shipment under the provisions of 173.421, 173.422, 173.424, 173.427 or 173.421-2 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; or

(2) Sections 171.15, 171.16, 175.45, and 175.700(b) of this subchapter pertaining to the reporting of incidents and decontamination if transported by aircraft.

13.0 PACKAGING AND TRANSPORTATION

13.2.1.5 Fissile Packaging

10CFR 71 Part 61(a)

Specific Standards for a Fissile Class II Shipment. A package for Fissile Class III shipment must be so designed and constructed and its contents so limited, and number of packages in a Fissile Class III shipment must be so limited, that: Twice this number of undamaged packages would be subcritical if stacked together in any arrangement, assuming close reflection on all sides of the stack by water;

10CFR 71 Part 61(b)

This number of packages would be subcritical if stacked together in any arrangement, closely reflected on all sides of the stack by water, and with optimum interspersed hydrogenous moderation. Except as permitted under 10 CFR 71.41, each package must be considered to have been subjected to the tests specified in 10 CFR 71.73 (Hypothetical Accident Conditions).

49CFR 173 Part 417

Authorized packaging-fissile materials.

(a) Except as provided in 173.453, fissile materials containing not more than A1 or A2 as appropriate, shall 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 following radioactive materials:

(i) 500 grams of uranium-235 in a single shipment as Fissile Class III or not more than 40 grams of uranium-235 per package as Fissile Class II. For Fissile Class II shipments, the transport index assigned to each package shall not be less than 0.4 for each gram of uranium-235 above 15 grams up to the maximum of 40 grams (transport index of 10).

(ii) 320 grams of plutonium-239 as plutonium-beryllium neutron sources in special form. Total radioactivity content may not exceed 20 curies. The transport index to be assigned to each package must be 0.5 for each 20 grams, or fraction thereof, of fissile plutonium.

(4) Any other Type A or Type B, Type B(U), or Type B(M) packaging for fissile radioactive materials that also meets the applicable standards for fissile materials in the regulations of the U.S. Nuclear Regulatory Commission (10 CFR part 71), and is used in accordance with 173.471.

(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, subject to the following conditions:

(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 shall be provided on the sides of the drum near the top, each covered with weatherproof tape; or equivalent device.

13.0 PACKAGING AND TRANSPORTATION

(v) Appropriate primary inner containment of the contents and sufficient packaging material, such as plastic or metal jars or cans shall be provided such that Specification 7A (178.350 of this subchapter) provisions are satisfied by the inner packaging.

(vi) Each inner container shall be capable of venting if subjected to the thermal test described in 10 CFR part 71.

(vii) Liquid contents shall be packaged in accordance with 173.412(m) and (n).

(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: HAZDOCS-2 Table No. 78

(7) Any metal cylinder that meets the performance requirements of 173.415 and 178.350 of this subchapter for Specification 7A Type A packaging may be used as a Fissile Class I package for the transport of residual ``heels'' of enriched solid uranium hexafluoride without a protective overpack in accordance with Table 3: HAZDOCS-2 Table No. 79

(8) Packagings as prescribed in paragraph (b)(5) of this section, for materials, quantities and conditions as authorized and prescribed therein.

(b) Fissile radioactive materials with radioactive content exceeding A1 or A2 shall be packaged in one of the following packagings:

(1) DOT Specification 6L (178.352 of this subchapter), metal packaging. Authorized only for uranium-235, plutonium-239 or plutonium-241, as metal, oxide, or compounds that do not decompose at temperatures up to 149C (300F). Radioactive decay heat output may not exceed 5 watts. Radioactive materials in normal form shall 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. Packages are authorized as Fissile Class II and III with materials limited in accordance with Table 4: HAZDOCS-2 Table No. 80

(2) DOT Specification 6M (178.354 of this subchapter), metal packaging. Authorized only for solid radioactive materials that will not decompose at temperatures up to 121C(250F). Radioactive decay heat output may not exceed 10 watts. Radioactive materials in other than special form shall 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. For fissile materials:

(i) Fissile Class I packages are limited to the following amounts of fissile 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 must not exceed three, including all of the sources of hydrogen within the DOT Specification 2R containment vessel.

(ii) Maximum quantities of fissile material for Fissile Class II and Fissile Class III, and other restrictions are given in Table 5. For a Fissile Class II package, the minimum transport index to be assigned is shown in Table 5 and for a Fissile Class III shipment, the allowable number of similar packages per conveyance and per transport vehicle is shown. Each Fissile Class III shipment is also subject to the requirements in 173.457. Where a maximum ratio of hydrogen to fissile material is specified in Table 5, only the hydrogen interspersed with the fissile material need be considered. For a uranium-233 shipment, the maximum inside diameter of the inner containment vessel must not exceed 12.1 centimeters (4.75 inches). Where necessary, a tight fitting steel insert shall be used to reduce a larger diameter inner containment vessel specified in 178.104 3(b) of this subchapter to the 12 centimeter (4.75 inch) limit. HAZDOCS-2 Table No. 81

(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 in accordance with 173.471.

(4) Type B(U) or B(M) packaging that meets the applicable requirements for fissile 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 Specifications 21PF 1, 21PF 1A, 21PF 1B, or 21PF 2 (

13.0 PACKAGING AND TRANSPORTATION

178.358 of this subchapter) phenolic-foam insulated overpack with snug fitting inner metal cylinders, meeting all requirements of 173.24, 173.411, 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.

(ii) DOT Specification 21PF 1 overpacks in use or under construction before April 1, 1989, must be modified to DOT Specification 21PF 1A before April 1, 1991. Use of unmodified DOT 21PF 1 overpacks is prohibited after March 31, 1991. All new construction to DOT Specification 21PF 1 beginning after March 31, 1989, must meet DOT Specification 21PF 1B.

(iii) Quantities of uranium hexafluoride are authorized as shown in Table 6, with each package to be shipped as Fissile Class II, and assigned a minimum transport index as also shown: HAZDOCS-2 Table No. 82

49CFR 173 Part 455

Classification of fissile materials packages.

(a) Except as provided in 173.453, each package of fissile materials shall be classified as follows:

(1) Fissile Class I. Packages that may be transported in unlimited number, and in any arrangement, and that require no nuclear criticality safety controls during transportation. A transport index is not assigned to Fissile Class I packages for the purposes of nuclear criticality safety control, although, the external radiation levels may require a transport index number.

(2) Fissile Class II. Packages that may be transported together in any arrangement but in numbers that do not exceed an aggregate transport index of 50. For the purposes of nuclear criticality safety control, individual packages may have a transport index of not less than 0.1 and not more than 10. However, the external radiation levels may require a higher transport index number. These shipments require no nuclear criticality safety control by the shipper during transportation.

(3) Fissile Class III. Shipments of packages of fissile materials that do not meet the requirements of Fissile Class I or Fissile Class II and that are controlled in transportation as prescribed in 173.457 by appropriate arrangements between the shipper and the carrier.

(b) The numerical values for package assignments as Fissile Class I, the transport indexes for Fissile Class II packages, and the conveyance and vehicle limitations for Fissile Class III shipments shall be determined in accordance with 10 CFR part 71.

49CFR 173 Part 457

Transportation of Fissile Class III shipments-specific requirements.

(a) Fissile Class III shipments shall incorporate transportation controls which are performed by the shipper or carrier, as appropriate, and 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 Class III shipments shall be transported:

(1) In a conveyance (transport vehicle if transported by public highway or rail) assigned to the exclusive use of the shipper with a specific restriction for the exclusive use to be provided in the appropriate arrangements between shipper and carrier and with instructions to that effect issued with the shipping papers;

(2) Except for shipments by aircraft, with an escort in a vehicle having the capability, equipment, authority, and instructions to provide administrative controls necessary to assure compliance with this section;

(3) In a conveyance (transport vehicle if transported by public highway or rail) containing no other packages of radioactive material that are required to bear one of the labels prescribed in 172.403 of this subchapter. Specific arrangements must be made between the shipper and the carrier, with instructions to that effect issued with the shipping papers; or

(4) Under any other procedure specifically authorized by the Associate Administrator for Hazardous Materials Safety in accordance with part 107 of this subchapter. (The information collection requirements contained in paragraph (b) were approved by the Office of Management and Budget under control number 2137 0535)

13.0 PACKAGING AND TRANSPORTATION

DOE5480.3 Section 10.b

Assumptions as to Unknown Properties. When the isotopic abundance, mass, concentration, degree if irradiation, degree of moderation, or other pertinent property of fissile material in any package is not known, the shipper shall package the fissile material as if the unknown properties have such credible values as will cause the maximum nuclear reactivity. Any special instructions needed to safely open the package are to be made available to the consignee.

DOE5480.3 Section 10.c(1)

10.c Preliminary Determinations.

(1) Prior to the first use of any packaging for the shipment of more than a Type A quantity of radioactive material or fissile materials, such packaging shall be inspected to ascertain that there are no cracks, pinholes, uncontrolled voids, or other defects that could significantly reduce its effectiveness.

13.2.1.6 Transuranic Waste Packaging

DOE5820.2A Chapter II, Section 3.d

Transuranic Waste Packaging.

(1) Newly generated transuranic waste shall be placed in noncombustible packaging that meets DOT requirements.

(2) All Type A transuranic waste containers shall be equipped with a method to prevent pressure buildup. Acceptable pressure-relief devices include permeable gaskets, vent clips, and filtered vents.

(3) The waste packages shall be marked, labeled, and sealed in accordance with the Waste Isolation Pilot Plant-Waste Acceptance Criteria, EPA, and DOT requirements, as defined in the WIPP-DOE-069, 40 CFR 262, Subpart C, and 49 CFR 172, Subparts D, E, and 49 CFR 173, Subpart I, where applicable, prior to shipping.

13.2.1.7 Hazardous Materials

49CFR 173 Part 3

Packaging and exceptions.

(a) The packaging of hazardous materials for transportation by air, highway, rail, or water must be as specified in this part. Methods of manufacture, packing, and storage of hazardous materials, that affect safety in transportation, must be open to inspection by a duly authorized representative of the initial carrier or of the Department. Methods of manufacture and related functions necessary for completion of a DOT specification or U.N. standard packaging must be open to inspection by a representative of the Department.

(b) The regulations setting forth packaging requirements for a specific material apply to all modes of transportation unless otherwise stated, or unless exceptions from packaging requirements are authorized.

(c) Salvage drums. Packages of hazardous materials that are damaged, defective. or found leaking and hazardous materials that have spilled or leaked may be placed in a metal or plastic removable head salvage drum that is compatible with the lading and shipped for repackaging or disposal under the following conditions:

(1) The drum must be a UN 1A2, 1B2, 1N2 or 1H2 tested and marked for Packing Group III or higher performance standards for liquids or solids and a leakproofness test of 20 kPa (3 psi). Alternatively, a drum manufactured and marked prior to October 1, 1993 as a salvage drum, in accordance with the provisions of this section in effect on September 30, 1991, is authorized. Capacity of the drum may not exceed 450 L (119 gallons).

(2) Each drum shall be provided when necessary with sufficient cushioning and absorption material to prevent excessive movement of the damaged package and to eliminate the presence of any free liquid at the time the salvage drum is closed. All cushioning and absorbent material used in the drum must be compatible with the hazardous material.

(3) Each drum shall be marked with the proper shipping name of the material inside the packaging and the name and address of the consignee. In addition, the drum shall be marked ``Salvage Drum''.

(4) Each drum shall be labeled as prescribed for the respective material.

13.0 PACKAGING AND TRANSPORTATION

(5) The shipper shall prepare shipping papers in accordance with subpart C of part 172 of this subchapter.
(6) The overpack requirements of 173.25 do not apply to drums used in accordance with this paragraph.

13.2.1.7.1 Bulk Packaging

49CFR 173 Part 24(b)

Additional general requirements for bulk packagings.

(a) Outage and filling limits. (1) Liquids and liquefied gases must be so loaded that the outage is at least one percent of the total capacity of a cargo or portable tank, or compartment thereof, or at least one percent of the total capacity of the tank and dome for tank car and multi-unit tank car tanks at the reference temperature of 46 C (115 F) for uninsulated tanks and 41 C (105 F) for insulated tanks.

(2) Hazardous materials may not be loaded into the dome of a tank car. If the dome of the tank car does not provide sufficient outage, vacant space must be left in the shell to provide the required outage.

(3) Bulk packagings for materials poisonous by inhalation. For a material which meets the definition of poisonous by inhalation (see 171.8 of this subchapter), the outage in a bulk packaging must be at least five percent of the total capacity of the tank or compartment at the reference temperature of 46 C (115 F) for uninsulated tanks and 41 C (105 F) for insulated tanks.

(b) Equivalent steel. For the purposes of this section, stainless steel is steel with a guaranteed minimum tensile strength of 51.7 deka newtons per square millimeter (75,000 psi) and a guaranteed elongation of 40 percent or greater. Where the regulations permit steel other than stainless steel to be used in place of a specified stainless steel (for example, as in 172.102 of this subchapter, special provision B30), the minimum thickness for the steel must be obtained from one of the following formulas, as appropriate:

Formula for metric units:

e1 = (12.74e0)/(Rm1 A1)\1/3\

Formula for non-metric units:

e1 = (144.2e0)/(Rm1 A1)\1/3\

where:

e0 = Required thickness of the reference stainless steel in millimeters or inches respectively;

e1 = Equivalent thickness of the steel used in millimeters or inches respectively;

Rm1 = Specified minimum tensile strength of the steel used in deka-newtons per square millimeter or pounds per square inch respectively; and

A1 = Specified minimum percentage elongation of the steel used multiplied by 100 (for example, 20 percent times 100 equals 20). Elongation values used must be determined from a 50 mm or 2 inch test specimen.

(c) Air pressure in excess of ambient atmospheric pressure may not be used to load or unload any lading which may create an air-enriched mixture within the flammability range of the lading in the vapor space of the tank.

(d) A bulk packaging may not be loaded with a hazardous material that:

(1) Is at a temperature outside of the packaging's design temperature range; or

(2) Exceeds the maximum weight of lading marked on the specification plate.

13.2.1.7.2 Non-Bulk Packagings

49CFR 173 Part 24a

(a) Packaging design. Except as provided in 172.312 of this subchapter:

(1) Inner packaging closures. A combination packaging containing liquid hazardous materials must be packed so that closures on inner packagings are upright.

(2) Friction. The nature and thickness of the outer packaging must be such that friction during transportation is not likely to generate an amount of heat sufficient to alter dangerously the chemical stability of the contents.

13.0 PACKAGING AND TRANSPORTATION

(3) Securing and cushioning. Inner packagings of combination packagings must be so packed, secured and cushioned to prevent their breakage or leakage and to control their movement within the outer packaging under conditions normally incident to transportation. Cushioning material must not be capable of reacting dangerously with the contents of the inner packagings.

(4) Metallic devices. Nails, staples and other metallic devices shall not protrude into the interior of the outer packaging in such a manner as to be likely to damage inner packagings or receptacles.

(5) Vibration. Each non-bulk package must be capable of withstanding, without rupture or leakage, the vibration test procedure specified in 178.608 of this subchapter.

(b) Non-bulk packaging filling limits.

(1) A single or composite non-bulk packaging may be filled with a liquid hazardous material only when the specific gravity of the material does not exceed that marked on the packaging, or a specific gravity of 1.2 if not marked, except as follows:

(i) A Packing Group I packaging may be used for a Packing Group II material with a specific gravity not exceeding the greater of 1.8, or 1.5 times the specific gravity marked on the packaging, provided all the performance criteria can still be met with the higher specific gravity material;

(ii) A Packing Group I packaging may be used for a Packing Group III material with a specific gravity not exceeding the greater of 2.7, or 2.25 times the specific gravity marked on the packaging, provided all the performance criteria can still be met with the higher specific gravity material; and

(iii) A Packing Group II packaging may be used for a Packing Group III material with a specific gravity not exceeding the greater of 1.8, or 1.5 times the specific gravity marked on the packaging, provided all the performance criteria can still be met with the higher specific gravity material.

(2) Except as otherwise provided in this section, a single or composite non-bulk packaging may not be filled with a solid hazardous material to a gross mass greater than the maximum gross mass marked on the packaging.

(3) A single or composite non-bulk packaging which is tested and marked for liquid hazardous materials may be filled with a solid hazardous material to a gross mass, in kilograms, not exceeding the rated capacity of the packaging in liters, multiplied by the specific gravity marked on the packaging, or 1.2 if not marked. In addition:

(i) A single or composite non-bulk packaging which is tested and marked for Packing Group I liquid hazardous materials may be filled with a solid Packing Group II hazardous material to a gross mass, in kilograms, not exceeding the rated capacity of the packaging in liters, multiplied by 1.5, multiplied by the specific gravity marked on the packaging, or 1.2 if not marked.

(ii) A single or composite non-bulk packaging which is tested and marked for Packing Group I liquid hazardous materials may be filled with a solid Packing Group III hazardous material to a gross mass, in kilograms, not exceeding the rated capacity of the packaging in liters, multiplied by 2.25, multiplied by the specific gravity marked on the packaging, or 1.2 if not marked.

(iii) A single or composite non-bulk packaging which is tested and marked for Packing Group II liquid hazardous materials may be filled with a solid Packing Group III hazardous material to a gross mass, in kilograms, not exceeding the rated capacity of the packaging in liters, multiplied by 1.5, multiplied by the specific gravity marked on the packaging, or 1.2 if not marked.

(4) Packagings tested as prescribed in 178.605 of this subchapter and marked with the hydrostatic test pressure as prescribed in 178.503(a)(5) of this subchapter may be used for liquids only when the vapor pressure of the liquid conforms to one of the following:

(i) The vapor pressure must be such that the total pressure in the packaging (i.e., the vapor pressure of the liquid plus the partial pressure of air

13.0 PACKAGING AND TRANSPORTATION

or other inert gases, less 100 kPa (15 psi)) at 55 C (131 F), determined on the basis of a maximum degree of filling in accordance with paragraph (b)(1) of this section and a filling temperature of 15 C (59 F)), will not exceed two-thirds of the marked test pressure;

(ii) The vapor pressure at 50 C (122 F) must be less than four-sevenths of the sum of the marked test pressure plus 100 kPa (15 psi); or

(iii) The vapor pressure at 55 C (131 F) must be less than two-thirds of the sum of the marked test pressure plus 100 kPa (15 psi).

(5) No hazardous material may remain on the outside of a package after filling.

(c) Mixed contents.

(1) An outer non-bulk packaging may contain more than one hazardous material only when-

(i) The inner and outer packagings used for each hazardous material conform to the relevant packaging sections of this part applicable to that hazardous material;

(ii) The package as prepared for shipment meets the performance tests prescribed in part 178 of this subchapter for the packing group indicating the highest order of hazard for the hazardous materials contained in the package;

(iii) Corrosive materials (except ORM D) in bottles are further packed in securely closed inner receptacles before packing in outer packagings; and

(iv) For transportation by aircraft, the total net quantity does not exceed the lowest permitted maximum net quantity per package as shown in Column 9a or 9b, as appropriate, of the 172.101 Table. The permitted maximum net quantity must be calculated in kilograms if a package contains both a liquid and a solid.

(2) A packaging containing inner packagings of Division 6.2 materials may not contain other hazardous materials, except dry ice.

(d) Liquids must not completely fill a receptacle at a temperature of 55øC (131øF) or less.

49CFR 173 Part 164(c)

For transportation by other than aircraft, mercury must be packaged:
(1) In any packaging which meets the requirements of part 178 of this subchapter at the Packing Group III performance level; or
(2) In non-specification reusable metal packagings.

49CFR 173 Part 173(a)

Paint, paint-related material, adhesives and ink.
When the 172.101 Table specifies that a hazardous material be packaged under this section, the following requirements apply. Except as otherwise provided in this part, the description ``Paint'' is the proper shipping name for paint, lacquer, enamel, stain, shellac, varnish, liquid aluminum, liquid bronze, liquid gold, liquid wood filler, and liquid lacquer base. The description ``Paint-related material'' is the proper shipping name for a paint thinning, drying, reducing or removing compound. However, if a more specific description is listed in the 172.101 Table of this subchapter, that description must be used.

49CFR 173 Part 173(b)

Paint, paint-related material, adhesives and ink must be packaged as follows:
(1) As prescribed in 173.202 of this part if it is a Packing Group II material or 173.203 of this part if it is a Packing Group III material; or
(2) In inner glass packagings of not over 1 L (0.3 gallon) capacity each or inner metal packagings of not over 5 L (1 gallon) each, packed in a strong outer packaging. Packages must conform to the packaging requirements of subpart B of this part but need not conform to the requirements of part 178 of this subchapter.

13.0 PACKAGING AND TRANSPORTATION

49CFR 173 Part 201(a)

Non-bulk packagings for liquid hazardous materials in Packing Group I.
When 172.101 of this subchapter specifies that a liquid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each packaging 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.

49CFR 173 Part 202(a)

Non-bulk packagings for liquid hazardous materials in Packing Group II.
When 172.101 of this subchapter specifies that a liquid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each packaging 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 (unless otherwise excepted), and to the particular requirements of the special provisions of Column 7 of the 172.101 Table.

49CFR 173 Part 203(a)

Non-bulk packagings for liquid hazardous materials in Packing Group III.
When 172.101 of this subchapter specifies that a liquid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each packaging 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.

49CFR 173 Part 211(a)

Non-bulk packagings for solid hazardous materials in Packing Group I.
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.

49CFR 173 Part 212(a)

Non-bulk packagings for solid hazardous materials in Packing Group II.
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.

49CFR 173 Part 213(a)

Non-bulk packagings for solid hazardous materials in Packing Group III.
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.

49CFR 173 Part 216(c)

Packagings for asbestos must conform to the general packaging requirements of subpart B of this part but need not conform to the requirements of part 178 of this subchapter. Asbestos must be offered for transportation and transported in_
(1) Rigid, leaktight packagings, such as metal, plastic or fiber drums, portable tanks, hopper-type rail cars, or hopper-type motor vehicles;
(2) Bags or other non-rigid packagings in closed freight containers, motor vehicles, or rail cars that are loaded by and for the exclusive use of the consignor and unloaded by the consignee;
(3) Bags or other non-rigid packagings which are dust and sift-proof. When transported by other than private carrier by highway, such packagings containing asbestos must be palletized and unitized by methods such as shrink-wrapping in plastic film or wrapping in fiberboard secured by strapping. Pallets need not be used during transportation by vessel for loads with slings that are unitized by methods such as

13.0 PACKAGING AND TRANSPORTATION

shrink,wrapping, if the slings adequately and evenly support the loads and the unitizing method prevents shifting of the bags or other non-rigid packagings during conditions normally incident to transportation; or
(4) Bags or other non-rigid packagings which are dust and sift-proof in strong outside fiberboard or wooden boxes.

49CFR 173 Part 226

Materials poisonous by inhalation, Division 6.1, Packing Group I, Hazard Zone A.
Division 6.1, Packing Group I, materials that are poisonous by inhalation and that fall within the boundaries of Hazard Zone A in the graph found in 173.133 must be packed in non-bulk packagings in accordance with the following paragraphs:

(a) In specification cylinders, as authorized in 173.40.

(b) In 1A1, 1B1, or 1N1 drums further packed in a 1A2 or 1H2 drum. Both inner and outer drums must conform to the performance test requirements of subpart M of part 178 of this subchapter at the Packing Group I performance level. The outer drum must have a minimum thickness of 1.50 mm (0.059 inches) for a 1A2 outer drum or 6.30 mm (0.248 inch) for a 1H2 outer drum. Outer 1A2 and 1H2 drums must withstand a hydrostatic test pressure of 100 kPa (15 psi). Capacity of the inner drum may not exceed 220 L (58 gallons). In addition, the inner drum must:

(1) Be capable of satisfactorily withstanding the hydrostatic pressure test in 178.605 of this subchapter at a test pressure of 550 kPa (80 psig);

(2) Satisfactorily withstand the leakproofness test in 178.604 of this subchapter using an internal air pressure of at least twice the vapor pressure at 55øC (131øF) of the material to be packaged;

(3) Have screw-type closures that are:

(i) Closed and tightened to a torque prescribed by the closure manufacturer, using a device that is capable of measuring torque;

(ii) Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transportation; and

(iii) Provided with a cap seal that is properly applied in accordance with the cap seal manufacturer's recommendations and is capable of withstanding an internal pressure of at least 100 kPa (15 psig).

(4) Have a minimum thickness as follows:

(i) If the capacity of the inner drum is less than or equal to 120 L (32 gallons), the minimum thickness of the inner drum is:

(A) For a 1A1 or 1N1 drum, 1.3 mm (0.051 inches); and

(B) For a 1B1 drum, 3.9 mm (0.154 inches).

(ii) If the capacity of the inner drum is greater than 120 L (32 gallons), the thickness of the inner drum is:

(A) For a 1A1 or 1N1 drum, 1.7 mm (0.067 inches); and

(B) For a 1B1 drum, 4.7 mm (0.185 inches); and

(5) Be isolated from the outer drum by a shock-mitigating, non-reactive material. There must be a minimum of 5.0 cm (2 inches) of cushioning material around the body of the inner drum, and at least 7.6 cm (3 inches) on the top and bottom, between the inner and outer drum.

(c) In combination packagings, consisting of an inner packaging system and an outer packaging, as follows:

13.0 PACKAGING AND TRANSPORTATION

(1) Outer packagings:
Steel drum: 1A2
Aluminum drum: 1B2
Metal drum, other than steel or aluminum: 1N2
Plywood drum: 1D
Fiber drum: 1G
Plastic drum: 1H2
Wooden barrel: 2C2
Steel jerrican: 3A2
Plastic jerrican: 3H2
Steel box: 4A1 or 4A2
Aluminum box: 4B1 or 4B2
Natural wood box: 4C1 or 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Expanded plastic box: 4H2
Solid plastic box: 4H2

(2) Inner packaging system. The inner packaging system consists of two packagings: an impact-resistant receptacle of glass, earthenware, plastic or metal securely cushioned with a non-reactive, absorbent material and packed within a leak-tight packaging of metal or plastic. This combination packaging in turn is packed within the outer packaging. Capacity of each inner receptacle may not exceed 4 L (1 gallon). An inner receptacle that has a closure must have a closure which is physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transportation. Both the inner packaging system and the outer packaging must conform to the performance test requirements of subpart M of part 178 of this subchapter, at the Packaging Group I performance level. The inner packaging system must meet these tests without the benefit of the outer packaging. The total amount of liquid contained in the outer packaging may not exceed 16 L (4 gallons).

49CFR 173 Part 227

Materials poisonous by inhalation. Division 6.1. Packing Group I, Hazard Zone B.
Division 6.1, Packing Group I, materials that are poisonous by inhalation and that fall within the boundaries of Hazard Zone B in the graph found in 173.133 shall be packed in non-bulk packagings which conform to the performance test requirements of subpart M of part 178 of this subchapter, at the Packing Group I performance level. The following packagings are authorized:
(a) Packagings as authorized in 173.226.
(b) 1A1, 1B1, 1N1 or 1H1 drum or 6HA1 composite further packed in a 1A2 or 1H2 drum. Both the inner and outer drums must conform to the performance test requirements of subpart M of part 178 of this subchapter at the Packing Group I performance level. The outer drum must have a minimum thickness of 1.35 mm (0.053 inches) for a 1A2 outer drum or 6.30 mm (0.248 inches) for a 1H2 outer drum. Outer 1A2 and 1H2 drums must withstand a hydrostatic test pressure of 100 kPa (15 psi). In addition, the inner drum must:
(1) Satisfactorily withstand the leakproofness test in 178.604 of this subchapter using an internal air pressure of at least two times the vapor pressure at 55øC (131øF) of the material to be packaged;
(2) Have screw closures that are:
(i) Closed and tightened to a torque prescribed by the closure manufacturer, using a device that is capable of measuring torque;
(ii) Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transportation; and
(iii) Provided with a cap seal that is properly applied in accordance with the cap seal manufacturer's recommendations and is capable of withstanding an internal pressure of at least 100 kPa (15 psig).
(3) Have a minimum thickness as follows:
(i) If the capacity of the inner drum is less than or equal to 30 L (7.9 gallons), the minimum thickness of the inner drum is:
(A) For a 1A1 drum, 0.69 mm (0.027 inch);
(B) For a 1B1 drum, 2.79 mm (0.110 inch);
(C) For a 1H1 drum, 1.14 mm (0.045 inch); and

13.0 PACKAGING AND TRANSPORTATION

(D) For a 6HA1 drum, the plastic inner container shall be 1.58 mm (0.0625 inch), the outer steel drum shall be 0.96 mm (0.038 inch).
(ii) If the capacity of the inner drum is greater than 30 L (7.9 gallons) but less than or equal to 120 L (32 gallons), the minimum thickness of the inner drum is:
(A) For a 1A1 drum, 1.08 mm (.043 inch);
(B) For a 1B1 drum, 3.9 mm (0.154 inch);
(C) For a 1H1 drum, 3.16 mm (0.125 inch); and
(D) For a 6HA1 drum, the plastic inner container shall be 1.58 mm (0.0625 inch) and the outer steel drum shall be 0.96 mm (0.0378 inches).
(iii) If the capacity of the inner drum is greater than 120 L (31.7 gallons), the thickness of the inner drum is:
(A) For a 1A1 or 1N1 drum, 1.35 mm (0.053 inches); (B) For a 1B1 drum, 4.7 mm (0.185 inches);
(C) For a 1H1 drum, 3.16 mm (0.124 inches); and
(D) For a 6HA1 drum, the plastic inner container shall be 1.58 mm (0.0625 inch) and the outer steel drum shall be 1.08 mm (0.043 inch).
(4) Be isolated from the outer drum by a shock-mitigating, non-reactive material. There must be a minimum of 5.0 cm (2 inches) of cushioning material around the body of the inner drum, and at least 7.6 cm (3 inches) on the top and bottom, between the inner and outer drum; and
(5) Have a capacity not greater than 220 L (58 gallons).
(c) 1A1, 1B1, 1N1 or 6HA1 drums described in paragraph (b) of this section may be used without being further packed in a 1A2 or 1H2 drum if the shipper loads the material, blocks and braces the drums within the transport vehicle and seals the transport vehicle used. Drums may not be stacked (double decked) within the transport vehicle. Shipments must be from one origin to one destination only without any intermediate pickup or delivery.

WA7890008967-DW Part III.2.B.h., Sentences 3 & 4

"Containers utilized for off-site shipment shall also comply with WAC 173-303-190(2) and (3). 305-B personnel shall comply with WAC 173-303-190(4)."

WAC-173-303 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 metal shipping container (49 CFR Parts 178 and 179) of no more than 416-liter (110 gallon) capacity and surrounded by, at a minimum, a sufficient quantity of absorbent material to completely absorb all of the liquid contents of the inside containers. The metal outer container must be full after packing with inside containers and absorbent material;

(3) The absorbent 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 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.

13.0 PACKAGING AND TRANSPORTATION

13.2.1.7.3 Oxidizer Packaging

49CFR 173 Part 419

Authorized packaging-oxidizing radioactive materials.

Certain oxidizing radioactive materials, as referenced in 172.101 of this subchapter, and which are not fissile materials and not in quantities exceeding A2, shall be packed in suitable inside packagings of glass, metal or compatible plastic and suitably cushioned with a material which will not react with the contents. Inner packaging and cushioning shall be enclosed within an outside packaging of wood, metal, or plastic. The package shall be capable of meeting the applicable test requirements of 173.465 without leakage of contents. For shipment by air, the maximum quantity in any package may not exceed 11.3 kilograms (25 pounds).

13.2.1.7.4 Multiple Hazard Classification

49CFR 173 Part 2(a)

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 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).
(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:
HAZDOCS-2 Table No. 25

(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 meets the definition of any other hazard class or division as defined in this part shall be classed as Division 6.2;
(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

13.0 PACKAGING AND TRANSPORTATION

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 173.421 2.

13.2.1.7.5 Packing Groups

49CFR 173 Part 121(a)

Class 3: Assignment of packing group.
The packing group of a Class 3 material is as assigned in Column 5 of the 172.101 Table. When the 172.101 Table provides more than one packing group for a hazardous material, or indicates that the packing group is to be determined on the basis of the grouping criteria for Class 3, the packing group shall be determined by applying the following criteria:
HAZDOCS-2 Table # 44

49CFR 173 Part 125(a)

Class 4: Assignment of packing group.
The packing group of a Class 4 material is as assigned in Column 5 of the 172.101 Table. When the 172.101 Table indicates that the packing group of a hazardous material is to be determined on the basis of test results following test methods given in appendix E of this part, the packing group shall be determined by applying the appropriate criteria given in this section.

49CFR 173 Part 125(b)

Packing group criteria for readily combustible materials of Division 4.1 is as follows:
(1) For materials other than metal powders, a material is assigned to:
(i) Packing Group II, if the burning rate is greater than 2.2 mm/s and the flame passes the wetted zone; or
(ii) Packing Group III, if the burning rate is greater than 2.2 mm/s and the wetted zone stops the flame.
(2) For metal powders, a material is assigned to:
(i) Packing Group II, if the zone of reaction spreads over the whole length of the sample in 5 minutes or less; or
(ii) Packing Group III, if the zone of reaction spreads over the whole length of the sample in more than 5 but not more than 10 minutes.
(3) Solids which may cause a fire through friction are assigned to packing groups by analogy with existing entries in the 172.101 Table.

49CFR 173 Part 125(c)

Packing group criteria for Division 4.2 materials is as follows:
(1) Pyrophoric liquids and solids of Division 4.2 are assigned to Packing Group I.
(2) A self-heating material is assigned to:
(i) Packing Group II, if the material gives a positive test result when tested with the 2.5-cm cube size sample; or
(ii) Packing Group III, if the material gives a positive test result when tested with the 10-cm cube size sample but a negative test result with the 2.5-cm cube size sample.

49CFR 173 Part 125(d)

A Division 4.3 dangerous when wet material is assigned to:
(1) Packing Group I, if spontaneous ignition occurs, or demonstrates a tendency of spontaneous ignition, or the rate of evolution of flammable gases is equal or greater than 10 liters per kilogram of material over any one minute; or
(2) Packing Group II, if the rate of evolution of flammable gases is equal to or greater than 20 liters per kilogram of material per hour, and which does not meet the criteria for Packing Group I; or
(3) Packing Group III, if the rate of evolution of flammable gases is greater than 1 liter per kilogram of material per hour, and which does not meet the criteria for Packing Group I or II.

49CFR 173 Part 127(b)

Assignment of packing groups.
(1) The packing group of a Division 5.1 material shall be as assigned in Column 5 of the 172.101 Table.
(2) When the 172.101 Table indicates that the packing group of a solid oxidizer is to be determined on the basis of the test results following test method given in appendix F to this part, the packing group shall be assigned by the following criteria:
(i) Packing Group I, for a material which, in either concentration tested, exhibits a burning time equal to or less than that of potassium bromate;

13.0 PACKAGING AND TRANSPORTATION

(ii) Packing Group II, for a material which, in either concentration tested, exhibits a burning time between that of potassium bromate and that of potassium perchlorate; or
(iii) Packing Group III, for a material which, in either concentration tested, exhibits a burning time between that of potassium perchlorate and that of ammonium persulphate.
(3) Liquid oxidizers are assigned to packing groups by analogy with existing entries in the 172.101 Table.

49CFR 173 Part 133(a)

Assignment of packing group and hazard zones for Division 6.1 materials.
The packing group of Division 6.1 materials shall be as assigned in Column 5 of the 172.101 Table. When the 172.101 Table provides more than one packing group and hazard zone for a hazardous material, the packing group and hazard zone shall be determined by applying the following criteria:
(1) The packing group assignment for routes of administration other than inhalation of vapors shall be in accordance with the following table: HAZDOCS-2 Table No. 47
(2)(i) The packing group and hazard zone assignments for liquids (see 173.115(c) of this subpart for gases) based on inhalation of vapors shall be in accordance with the following Table: HAZDOCS-2 Table No. 48
(ii) These criteria are represented graphically in Figure 1:
(3) When the packing group determined by applying these criteria is different for two or more (oral, dermal or inhalation) routes of administration, the packing group assigned to the material shall be that indicated for the highest degree of toxicity for any of the routes of administration.
(4) Notwithstanding the provisions of this paragraph, the packing group and hazard zone of a tear gas substance is as assigned in Column 5 of the 172.101 Table.

49CFR 173 Part 137

Class 8: Assignment of packing group.
The packing group of Class 8 material is indicated in Column 5 of the 172.101 Table. When the 172.101 Table provides more than one packing group for a hazardous material, the packing group shall be determined by applying the following criteria:
(a) Packing Group 1. Substances that cause visible destruction or irreversible alterations of the skin tissue at the site of contact when tested on the intact skin of an animal for a period of not more than 3 minutes.
(b) Packing Group II. Substances, other than those meeting Packing Group I criteria, that cause visible destruction or irreversible alterations of the skin tissue at the site of contact when tested on the intact skin of an animal for a period of not more than 60 minutes.
(c) Packing Group III. Substances, other than those meeting Packing Group I or II criteria:
(1) That cause visible destruction or irreversible alterations of the skin tissue at the site of contact when tested on the intact skin of an animal for a period of not more than 4 hours; or
(2) Which have a corrosion rate on steel or aluminum surfaces exceeding 6.25 mm (0.246 inch) a year at a test temperature of 55 øC (131 øF).

13.2.1.8.1 Activity Limitations

49CFR 173 Part 431

Activity limits for Type A and Type B packages.

(a) A Type A package shall not contain a quantity of radioactivity greater than A1 (for special form radioactive material) or A2 (for normal form radioactive material) as listed in 173.435, or for 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 or in the applicable approval certificate under 173.471 or 173.473.

13.0 PACKAGING AND TRANSPORTATION

13.2.1.8.2 Radiation Levels

49CFR 173 Part 441

Radiation level limitations.

(a) Except as provided in paragraph (b) of this section, each package of radioactive materials offered for transportation shall be designed and prepared for shipment so that under conditions normally incident to transportation the radiation level does not exceed 200 millirem per 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 shall be transported by exclusive use shipment only and the radiation levels for such shipment must not exceed the following during transportation:

(1) 200 millirem per hour (2 millisievert per hour) on the external surface of the package unless the following conditions are met, in which case the limit is 1000 millirem per hour (10 millisievert per hour).

(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) 200 millirem per hour (2 millisievert per hour) 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 is used), and on the lower external surface of the vehicle;

(3) 10 millirem per hour (0.1 millisievert per hour) 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) 2 millirem per hour (0.02 millisievert per hour) 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 and operate under provisions of a State or Federally regulated radiation protection program.

(c) For shipments made under the provisions of paragraph (b) of this section, the shipper shall provide specific written instructions for maintenance of the exclusive use shipment controls to the carrier. The instructions shall be included with the shipping paper information.

(d) Packages exceeding the radiation level or transport index prescribed in paragraph (a) of this section shall not be transported by aircraft.

(e) The written instructions required for exclusive use shipments must be sufficient so that, when followed, they will cause the carrier to avoid actions which will unnecessarily delay delivery or unnecessarily result in increased radiation levels or radiation exposures. (The information collection requirements contained in paragraph (c) were approved by the Office of Management and Budget under control number 2137 0536)

13.2.1.8.3 Thermal Levels

49CFR 173 Part 442

Thermal limitations.

Each package of radioactive material shall be designed, constructed, and loaded so that:

(a) The heat generated within the package because of the radioactive contents will not, at any time during transportation, affect the integrity of the package under conditions normally incident to transportation; 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 38ø C (100ø F), exceed either:

(1) 50ø C (122F) in other than an exclusive use shipment; or

(2) 82ø C (180F) in an exclusive use shipment.

13.0 PACKAGING AND TRANSPORTATION

13.2.1.8.4 Contamination Levels

49CFR 173 Part 443

Contamination control.

(a) The level of non-fixed (removable) radioactive contamination on the external surfaces of each package offered for shipment shall be kept as low as practicable. The level of non-fixed radioactive contamination may be determined by 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 shall be taken in the mostappropriate locations to yield a representative assessment of the non-fixed contamination levels. Except as provided in paragraph (b) of this section, the amount of radioactivity measured on any single wiping material when averaged over the surface wiped shall not exceed the limits given in Table 10 at any time during transport. Other methods of assessment of equal or greater efficiency may be used. When other methods are used the detection efficiency of the method used shall be taken into account and in no case shall the non-fixed contamination on the external surfaces of the package exceed ten times the limits listed in Table 10.HAZDOCS-2 Table No. 90

(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 shall not exceed ten times the levels prescribed in paragraph (a) of this section. The levels at the beginning of transport shall 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 radioactive materials as an exclusive use shipment which utilizes the provisions of paragraph (b) of this section shall be surveyed with appropriate radiation detection instruments after each use. A vehicle shall not be returned to service until the radiation dose rate at each accessible surface is 0.5 millirem per hour or less, and there is no significant removable (non-fixed) radioactive surface contamination as specified in paragraph (a) of this section.

(d) Paragraph (b) and (c) of this section do not apply to any closed transport vehicle used solely for the transportation by public highway of 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 10 millirem per hour at the surface or 2 millirem 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.

13.2.5 Offsite Transportation Management

49CFR 173 Part 22(a)

Use of packagings authorized under exemptions.

(a) Except as provided in paragraph (b) of this section, no person may offer a hazardous material for transportation in a packaging the use of which is dependent upon an exemption issued under subpart B of part 107 of this title, unless that person is the holder of or a party to the exemption.

(b) If an exemption authorizes the use of a packaging for the shipment or transportation of a hazardous material by any person or class of persons other than or in addition to the holder of the exemption, that person or a member of that class of persons may use the packaging for the purposes authorized in the exemption subject to the terms specified therein. However, no person may use a packaging under the authority of this paragraph unless he maintains a copy of the exemption at each facility where the packaging is being used in connection with the shipment or transportation of the hazardous material concerned. Copies of exemptions may be obtained from the Associate Administrator for Hazardous Materials Safety, U.S. Department of Transportation, Washington, DC 20590 0001, Attention: Docket Section.

49CFR 173 Part 23

Previously authorized packaging.

13.0 PACKAGING AND TRANSPORTATION

(a) When the regulations specify a packaging with a specification marking prefix of ``DOT,'' a packaging marked prior to January 1, 1970, with the prefix of ``ICC'' may be used in its place if the packaging otherwise conforms to applicable specification requirements.

(b) [Reserved]

(c) After July 2, 1982, a seamless aluminum cylinder manufactured in conformance with and for use under DOT exemption E 6498, E 7042, E 8107, E 8364, or E 8422, may be continued in use if marked before or at the time of the next retest with the specification identification ``3AL'' immediately above the exemption number, or the DOT mark (e.g., DOT 3AL 1800) is added in proximity to the exemption marking.

(d) Cylinders (spheres) manufactured and marked DOT E 6616 prior to January 1, 1983, may be continued in use if marked before or at the time of the next retest with the specification identification ``4BA'' near the exemption marking.

(e) After October 1, 1984, cylinders manufactured for use under exemptions DOT E 6668 or E 8404 may be continued in use, and must be marked ``DOT 4LXXXYY'' (XXX to be replaced by the service pressure, YY to be replaced by the letters ``AL'', if applicable) in compliance with Specification 4L (178.57 of this subchapter) on or before January 1, 1986. The ``DOT 4LXXXYY'' must appear in proximity to other required specification markings.

(49 U.S.C. 1803, 1804, 1808; 49 CFR 1.53, app. A to part 1)

DOE1540.2 Chapter III, Section 2.a

Procedures

Requirements for Use of DOT Exemptions.

DOT Exemptions may be used by DOE and its contractors provided the exemption is either issued to DOE or DOE is a party to an exemption. The user must possess a copy of the exemption. The user must provide usage data to the operations office responsible for maintaining the exemption.

DOE1540.2 Chapter IV, Section 2.c

Submittal of Requests.

All requests for new DOE alternatives must be submitted to EH-34 at least 120 days prior to the need date. Each request for an alternative must specify an expiration date not to exceed 2 years. If there is a need for the DOE alternative beyond the expiration date a formal renewal request must be submitted to EH-34 at least 90 days prior to the expiration date. EH-34 shall review the request and approve or disapprove an alternative. Upon approval the DOE alternative will be assigned a sequential identifying number and the requestor notified that the alternative is approved. A copy of the approval and backup data will be provided to DP-12. An alternative is considered under timely renewal and remains in effect provided the renewal request is received by EH-34 at least 60 days prior to the expiration date.

13.2.6.1 Marking Requirements

40CFR 262 Part 32

Marking.

(a) Before transporting or offering hazardous waste for transportation off-site, a generator must mark each package of hazardous waste in accordance with the applicable Department of Transportation regulations on hazardous materials under 49 CFR Part 172;

(b) Before transporting hazardous waste or offering hazardous waste for transportation off-site, a generator must mark each container of 110 gallons or less used in such transportation with the following words and information displayed in accordance with the requirements of 29 CFR 172.304;

HAZARDOUS WASTE - Federal Law Prohibits improper Disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental protection Agency.

Generator's Name and Address Manifest Document Number

49CFR 172 Part 301

General marking requirements for non-bulk packagings.

(a) Proper shipping name and identification number.

13.0 PACKAGING AND TRANSPORTATION

(1) Except as otherwise provided by this subchapter, each person who offers for transportation a 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.

49CFR 172 Part 302

General marking requirements for bulk packagings.

(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

13.0 PACKAGING AND TRANSPORTATION

(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

(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''.

49CFR 172 Part 304

Marking requirements.

(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.

(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.

49CFR 172 Part 310

Radioactive materials.

(a) In addition to any other markings required by this subpart, each package containing radioactive materials must be marked as follows:

(1) Each package of radioactive materials in excess of 110 pounds (50 kilograms) must have its gross weight plainly and durably marked on the outside of the package.

(2) Each package of radioactive materials which conforms to the requirements for Type A or Type B packaging (173.403 of this subchapter) must be plainly and durably marked on the outside of the package in letters at least -inch (13 mm.) high, with the words ``TYPE A'' or ``TYPE B'' as appropriate. A packaging which is not in compliance with these requirements may not be so marked.

(3) Each package of radioactive material 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.)
(49 U.S.C. 1803, 1804, 1808, 49 CFR 1.53, app. A to part 1)

13.0 PACKAGING AND TRANSPORTATION

49CFR 172 Part 312

Liquid hazardous materials in non-bulk packagings.

(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.

(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.

49CFR 172 Part 313(a)

Poisonous hazardous materials.
For materials poisonous by inhalation (see 171.8 of this subchapter), the package shall be marked ``Inhalation Hazard'' in association with the required labels or placards, as appropriate, or shipping name, when required. (See 172.302(b) of this subpart for size of markings on bulk packages.) Bulk packagings must be marked on two opposing sides.

49CFR 172 Part 313(b)

Each non-bulk plastic outer packaging used as a single or composite packaging for materials meeting the definition of Division 6.1 (in 173.132 of this subchapter) shall be permanently marked, by embossment or other durable means, with the word ``POISON'' in letters at least 6.3 mm (0.25 inch) in height. Additional text or symbols related to hazard warning may be included in the marking. The marking shall be located within 150 mm (6 inches) of the closure of the packaging.

49CFR 172 Part 324

Hazardous substances in non-bulk packagings.

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 the appendix to 172.101; or

13.0 PACKAGING AND TRANSPORTATION

(2) For waste streams, the waste stream number; or

(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.

49CFR 172 Part 326

Portable tanks.

(a) Shipping name. No person may offer for transportation or transport a portable tank containing a hazardous material unless it is legibly marked on two opposing sides with the proper shipping name specified for the material in the 172.101 Table.

(b) Owner's name. The name of the owner or of the lessee, if applicable, must be displayed on a portable tank that contains a hazardous material.

(c) Identification numbers.

(1) If the identification number markings required by 172.302(a) are not visible, a transport vehicle or freight container used to transport a portable tank containing a hazardous material must be marked on each side and each end as required by 172.332 with the identification number specified for the material in the 172.101 Table.

(2) Each person who offers a portable tank containing a hazardous material to a motor carrier, for transportation in a transport vehicle or freight container, shall provide the motor carrier with the required identification numbers on placards, orange panels, or the white square-on-point configuration, as appropriate, for each side and each end of the transport vehicle or freight container from which identification numbers on the portable tank are not visible.

49CFR 172 Part 328

Cargo tanks.

(a) Providing and affixing identification numbers. Unless a cargo tank is already marked with the identification numbers required by this subpart, the identification numbers must be provided or affixed as follows:

(1) A person who offers a hazardous material to a motor carrier for transportation in a cargo tank shall provide the motor carrier the identification numbers on placards or shall affix orange panels containing the required identification numbers, prior to or at the time the material is offered for transportation.

(2) A person who offers a cargo tank containing a hazardous material for transportation shall affix the required identification numbers on panels or placards prior to or at the time the cargo tank is offered for transportation.

(b) Required markings: Gases. Except for certain nurse tanks which must be marked as specified in 173.315(m) of this subchapter, each cargo tank transporting a Class 2 material subject to this subchapter must be marked, in lettering no less than 50 mm (2.0 inches), on each side and each end with-

(1) The proper shipping name specified for the gas in the 172.101 Table; or

(2) An appropriate common name for the material (e.g., ``Refrigerant Gas'').

(c) QT/NQT markings. Each MC 330 and MC 331 cargo tank must be marked near the specification plate, in letters no less than 50 mm (2.0 inches) in height, with_

(1) ``QT'', if the cargo tank is constructed of quenched and tempered steel; or

13.0 PACKAGING AND TRANSPORTATION

(2) ``NQT'', if the cargo tank is constructed of other than quenched and tempered steel.

WAC-173-303 Section 190(3)

Marking. The generator shall:

190 (3) (a) Mark each package of dangerous waste in accordance with United States DOT regulations, 49 CFR Part 172; and

190 (3) (b) Mark each package containing one hundred ten gallons or less of dangerous waste with the following, or equivalent words and information,
displayed in accordance with 49 CFR 172.304:

HAZARDOUS WASTE - State and federal law prohibits improper disposal. If found, contact the nearest police or public safety authority, and the Washington state department of ecology or the United States Environmental Protection Agency.

Generator's Name and Address

.....

.....

.....

Manifest Document Number
.....

WAC-470-12 Section 050(3)

Tank vehicles used for the transportation of flammable liquids shall, regardless of the quantity being transported or whether loaded or empty, be conspicuously and legibly marked on each side and the rear thereof, in letters at least three inches high on a background of sharply contrasting color, optionally, as follows: With a sign or lettering on the vehicle, with the word "FLAMMABLE," or With the common name of the flammable liquid being transported; or With the name of the carrier or his trademark, when and only when such name or mark plainly indicated the flammable nature of the cargo.

13.2.6.2 Labeling Requirements

40CFR 262 Part 31

Labeling.

Before transporting or offering hazardous waste for transportation off-site, a generator must label each package in accordance with the applicable Department of Transportation regulations on hazardous materials under 49 CFR Part 172.

49CFR 172 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:

13.0 PACKAGING AND TRANSPORTATION

(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 18m3 (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: HAZDOCS-2 Table No. 16

49CFR 172 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; and

(2) For other than Class 2 or Class 1 materials (for subsidiary labeling requirements for Class 1 materials see paragraph (e) 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: HAZDOCS-2 Table No. 17

(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) Radioactive Materials. Each package containing a radioactive material that also meets the definition of one or more additional hazards, except Class 9, shall be labeled as a radioactive material as required by 172.403 of this subpart and for each additional hazard.

(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.

49CFR 172 Part 403

Radioactive material.

(a) Unless excepted from labeling by 173.421 through 173.425 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 radioactive material is based on the radiation level at the surface of the package, the transport index (173.403 of this subchapter) and, if appropriate, the fissile characteristics of the package. The proper category of label shall be determined in accordance with paragraph (c) of this section. The label to be applied shall be the highest category required for any of the three 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 60 millirem per hour which contains no fissile material must bear a Radioactive Yellow-III label.

(c) Category of Label to be Applied to Radioactive Materials Packages:
HAZDOCS-2 Table No. 18

(d) EMPTY label. See 173.427(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, the most restrictive radionuclides on the basis of radiotoxicity must be listed as space on the label allows.

(2) Activity. Units shall be expressed in appropriate curie units, i.e., curies (Ci), millicuries (mCi) or microcuries (uCi) (abbreviations are authorized). For a fissile material, the weight in grams or kilograms of the fissile radioisotope also may be inserted.

(3) Transport index. (See 173.403 of this subchapter.) (49 U.S.C. 1803, 1804, 1808; 49 CFR 1.53, app. A to part 1)

49CFR 172 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.

49CFR 172 Part 406

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 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:

13.0 PACKAGING AND TRANSPORTATION

(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 non-bulk 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.

(f) Visibility. A label must be clearly visible and may not be obscured by markings or attachments.

WAC-173-303 Section 190(2)

Labeling. The generator shall label each package in accordance with United States DOT regulations, 49 CFR Part 172.

13.2.6.3 Placarding Requirements

49CFR 172 Part 203(f)

Transportation by air. When a package containing a hazardous material is offered for transportation by air and this subchapter prohibits its transportation aboard passenger-carrying aircraft, the words "Cargo aircraft only" must be entered after the basic description.

49CFR 172 Part 203(j)

Dangerous when wet material. The words "Dangerous when wet" shall be entered on the shipping paper in association with the basic description for a dangerous when wet material in 173.124(c) of this subchapter.

49CFR 172 Part 203(m)(3)

For materials which are poisonous by inhalation (see 171.8 of this subchapter), the words "Poison-Inhalation Hazard" and the words "Zone A", "Zone B", "Zone C", or "Zone D", for gases or "Zone A" or "Zone B" for liquids, as appropriate, shall be entered on the shipping paper immediately following the shipping description. The word 'Poison" need not be repeated if it otherwise appears in the shipping description.

49CFR 172 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

13.0 PACKAGING AND TRANSPORTATION

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 (c) 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.

(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:
HAZDOCS-2 Table No. 19
HAZDOCS-2 Table No. 20

(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.

13.0 PACKAGING AND TRANSPORTATION

(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.

(9) For domestic transportation, a Class 9 placard is not required. A bulk packaging containing a Class 9 material must be marked on each side and each end with the appropriate identification number displayed on an orange panel or a white-square-on-point display configuration are 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.

49CFR 172 Part 505

Placarding for subsidiary hazards.

(a) Each transport vehicle, freight container, portable tank and 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).

49CFR 172 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.

(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]

WAC-173-303 Section 190(4)

Placarding. The generator shall placard, or offer to the initial transporter all appropriate placards in accordance with United States DOT

13.0 PACKAGING AND TRANSPORTATION

regulations, 49 CFR Part 172, Subpart F.

13.2.7 Shipping Papers, Bills of Lading and Manifests

40CFR 261 Part 4(d)

Samples.

(1) Except as provided in paragraph (d)(2) of this section, a sample of solid waste or a sample of water, soil, or air, which is collected for the sole purpose of testing to determine its characteristics or composition, is not subject to any requirements of this part or parts 262 through 268 or part 270 or part 124 of this chapter or to the notification requirements of section 3010 of RCRA, when:

(i) The sample is being transported to a laboratory for the purpose of testing; or

(ii) The sample is being transported back to the sample collector before transport to a laboratory for testing; or

(iii) The sample is being stored by the sample collector before transport to a laboratory for testing; or

(iv) The sample is being stored in a laboratory before testing; or

(v) The sample is being stored in a laboratory after testing but before it is returned to the sample collector; or

(vi) The sample is being stored temporarily in the laboratory after testing for a specific purpose (for example, until conclusion of a court case or enforcement action where further testing of the sample may be necessary).

(2) In order to qualify for the exemption in paragraphs (d)(1) (i) and (ii) of this section, a sample collector shipping samples to a laboratory and a laboratory returning samples to a sample collector must:

(i) Comply with U.S. Department of Transportation (DOT), U.S. Postal Service (USPS), or any other applicable shipping requirements; or

(ii) Comply with the following requirements if the sample collector determines that DOT, USPS, or other shipping requirements do not apply to the shipment of the sample:

(A) Assure that the following information accompanies the sample:

(1) The sample collector's name, mailing address, and telephone number;

(2) The laboratory's name, mailing address, and telephone number;

(3) The quantity of the sample;

(4) The date of shipment; and

(5) A description of the sample.

(B) Package the sample so that it does not leak, spill, or vaporize from its packaging.

(3) This exemption does not apply if the laboratory determines that the waste is hazardous but the laboratory is no longer meeting any of the conditions stated in paragraph (d)(1) of this section.

40CFR 261 Part 4(e)

Treatability Study Samples.

(1) Except as provided in paragraph (e)(2) of this section, persons who generate or collect samples for the purpose of conducting treatability studies as defined in section 260.10, are not subject to any requirement of parts 261 through 263 of this chapter or to the notification requirements of Section 3010 of RCRA, nor are such samples included in the quantity determinations of 261.5 and 262.34(d) when:

(i) The sample is being collected and prepared for transportation by the generator or sample collector; or

(ii) The sample is being accumulated or stored by the generator or sample collector prior to transportation to a laboratory or testing facility; or

(iii) The sample is being transported to the laboratory or testing facility for the purpose of conducting a treatability study.

(2) The exemption in paragraph (e)(1) of this section is applicable to samples of hazardous waste being collected and shipped for the purpose of conducting treatability studies provided that:

(i) The generator or sample collector uses (in "treatability studies") no more than 1000 kg of any non-acute hazardous waste, 1 kg of acute hazardous waste, or 250 kg of soils, water, or debris contaminated with acute hazardous waste for each process being evaluated for each generated waste stream; and

(ii) The mass of each sample shipment does not exceed 1000 kg of non-acute hazardous waste, 1 kg of acute hazardous waste, or 250 kg of soils, water, or debris contaminated with acute hazardous waste; and

(iii) The sample must be packaged so that it will not leak, spill, or vaporize from its packaging during shipment and the requirements of paragraph A or B of this subparagraph are met.

(A) The transportation of each sample shipment complies with U.S. Department of Transportation (DOT), U.S. Postal Service (USPS), or any other applicable shipping requirements; or

(B) If the DOT, USPS, or other shipping requirements do not apply to the shipment of the sample, the following information must accompany

13.0 PACKAGING AND TRANSPORTATION

the sample:
(1) The name, mailing address, and telephone number of the originator of the sample;
(2) The name, address, and telephone number of the facility that will perform the treatability study;
(3) The quantity of the sample;
(4) The date of shipment; and
(5) A description of the sample, including its EPA Hazardous Waste Number.
(iv) The sample is shipped to a laboratory or testing facility which is exempt under 261.4(f) or has an appropriate RCRA permit or interim status.
(v) The generator or sample collector maintains the following records for a period ending 3 years after completion of the treatability study:
(A) Copies of the shipping documents;
(B) A copy of the contract with the facility conducting the treatability study;
(C) Documentation showing:
(1) The amount of waste shipped under this exemption;
(2) The name, address, and EPA identification number of the laboratory or testing facility that received the waste;
(3) The date the shipment was made; and
(4) Whether or not unused samples and residues were returned to the generator.
(vi) The generator reports the information required under paragraph (e)(v)(C) of this section in its biennial report.
(3) The Regional Administrator, or State Director (if located in an authorized State), may grant requests, on a case-by-case basis, for quantity limits in excess of those specified in paragraph (e)(2)(i) of this section, for up to an additional 500 kg of non-acute hazardous waste, 1 kg of acute hazardous waste, and 250 kg of soils, water, or debris contaminated with acute hazardous waste, to conduct further treatability study evaluation when: There has been an equipment or mechanical failure during the conduct of a treatability study; there is a need to verify the results of a previously conducted treatability study; there is a need to study and analyze alternative techniques within a previously evaluated treatment process; or there is a need to do further evaluation of an ongoing treatability study to determine final specifications for treatment. The additional quantities allowed are subject to all the provisions in paragraphs (e)(1) and (e)(2)(ii)(vi) of this section. The generator or sample collector must apply to the Regional Administrator in the Region where the sample is collected and provide in writing the following information:
(i) The reason why the generator or sample collector requires additional quantity of sample for the treatability study evaluation and the additional quantity needed;
(ii) Documentation accounting for all samples of hazardous waste from the waste stream which have been sent for or undergone treatability studies including the data each previous sample from the waste stream was shipped, the quantity of each previous shipment, the laboratory or testing facility to which it was shipped, what treatability study processed were conducted on each sample shipped, and the available results of each treatability study;
(iii) A description of the technical modifications or change in specifications which will be evaluated and the expected results;
(iv) If such further study is being required due to equipment or mechanical failure, the applicant must include information regarding the reason for the failure or breakdown and also include what procedures or equipment improvements have been made to protect against further breakdowns; and
(v) Such other information that the Regional Administrator considers necessary.

40CFR 262 Part 21

(a) If the State to which the shipment is manifested (consignment State) supplies the manifest and requires its use, then the generator must use that manifest.

(b) If the consignment State does not supply the manifest, but the State in which the generator is located (generator State) supplies the manifest and requires its use, then the generator must use that State's manifest.

(c) If neither the generator State nor the consignment State supplies the manifest, then the generator may obtain the manifest from any source.

40CFR 262 Part 23

(a) The generator must:

(1) Sign the manifest certification by hand; and

13.0 PACKAGING AND TRANSPORTATION

(2) Obtain the handwritten signature of the initial transporter and date of acceptance on the manifest; and

(3) Retain one copy, in accordance with 262.40(a).

(b) The generator must give the transporter the remaining copies of the manifest.

(c) For shipments of hazardous waste within the United States solely by water (bulk shipments only), the generator must send three copies of the manifest dated and signed in accordance with this section to the owner or operator of the designated facility or the last water (bulk shipment) transporter to handle the waste in the United States if exported by water. Copies of the manifest are not required for each transporter.

(d) For rail shipments of hazardous waste within the United States which originate at the site of generation, the generator must send at least three copies of the manifest dated and signed in accordance with this section to:

(l) The next non-rail transporter, if any; or

(2) The designated facility if transported solely by rail; or

(3) The last rail transporter to handle the waste in the United States if exported by rail.

(e) For shipments of hazardous waste to a designated facility in an authorized State which has not yet obtained authorization to regulate that particular waste as hazardous, the generator must assure that the designated facility agrees to sign and return the manifest to the generator, and that any out-of-state transporter signs and forwards the manifest to the designated facility.

40CFR 262 Part 40

Recordkeeping

(a) A generator must keep a copy of each manifest signed in accordance with Section 262.23(a) for three years or until he receives a signed copy from the designated facility which received the waste. The signed copy must be retained as a record for at least three years from the date the waste was accepted by the initial transporter.

(b) A generator must keep a copy of each Biennial Report and Exception Report for a period of at least three years from the due date of the report.

(c) A generator must keep records of any test results, waste analyses, or other determinations made in accordance with Section 262.11 for at least three years from the date that the waste was last sent to on-site or off-site treatment, storage, or disposal.

(d) The periods or retention referred to in this section are extended automatically during the course of any unresolved enforcement action regarding the regulated activity or as requested by the Administrator.

49CFR 172 Part 101(c)(8)

Hazardous substances. The appendix to this section lists materials which are listed or designated as hazardous substances under section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Proper shipping names for hazardous substances (see appendix to this section and 171.8 of this subchapter) shall be determined as follows:
(i) If the hazardous substance appears in the Table by technical name, then the technical name is the proper shipping name.
(ii) If the hazardous substance does not appear in the Table and is not a forbidden material, then an appropriate generic, or "n.o.s.", shipping name shall be selected corresponding to the hazard class (and packing group, if any) of the material as determined by the defining criteria of this subchapter (see 173.2 and 173.2a of this chapter). For example, a hazardous substance which is listed in the appendix but not in the Table and which meets the definition of a flammable liquid might be described as "Flammable liquid, n.o.s." or other appropriate shipping name corresponding to the flammable liquid hazard class.

13.0 PACKAGING AND TRANSPORTATION

49CFR 172 Part 101(c)(9)

Hazardous wastes. If the word "waste" is not included in the hazardous material description in Column 2 of the Table, the proper shipping name for a hazardous waste (as defined in 171.8 of this subchapter), shall include the word "Waste" preceding the proper shipping name of the material. For example: Waste acetone.

49CFR 172 Part 101(c)(10)

Mixtures and solutions.
(i) A mixture or solution not identified specifically by name, comprised of a hazardous material identified in the Table by technical name and non-hazardous material, shall be described using the proper shipping name of the hazardous material and the qualifying word "mixture" or "solution", as appropriate, unless -
(A) Except as provided in 172.101(i)(4) the packaging specified in Column 8 is inappropriate to the physical state of the material;
(B) The shipping description indicates that the proper shipping name applies only to the pure or technically pure hazardous material;
(C) The hazard class, packing group, or subsidiary hazard of the mixture or solution is different from that specified for the entry;
(D) There is a significant change in the measures to be taken in emergencies;
(E) The material is identified by special provision in Column 7 of the 172.101 Table as material poisonous by inhalation; however, it no longer meets the definition of poisonous by inhalation or it falls within a different hazard zone that specified in the special provision; or
(F) The material can be appropriately described by a shipping name that describes its intended application, such as "Coating solution", Extracts, flavoring" or "Compound, cleaning liquid".
(ii) If one or more of the conditions specified in paragraph (c)(10)(i) of this section is satisfied, then a proper shipping name shall be selected as prescribed in paragraph (c)(12)(ii) of this section.

49CFR 172 Part 101(c)(12)

Except when the proper shipping name in the Table is preceded by a plus (+)--
(i) If it is specifically determined that a material meets the definition of a hazard class or packing group, other than the class or packing group shown in association with the proper shipping name, or does not meet the defining criteria for a subsidiary hazard shown in Column 6 of the Table, the material shall be described by an appropriate proper shipping name listed in association with the correct hazard class, packing group, or subsidiary hazard for the material.
(ii) Generic or n.o.s. descriptions. If an appropriate technical name is not shown in the Table, selection of a proper shipping name shall be made from the generic or n.o.s. descriptions corresponding to the specific hazard class, packing group, or subsidiary hazard, if any, for the material. The name that most appropriately describes the material shall be used; e.g., an alcohol not listed by its technical name in the Table shall be described as "Alcohol, n.o.s." rather than "Flammable liquid, n.o.s.". Some mixtures may be more appropriately described according to their application, such as "Coating solution" or Extracts, flavoring, liquid", rather than by an n.o.s. entry, such as "Flammable liquid, n.o.s." It should be noted, however, that an n.o.s. description as proper shipping name may not provide sufficient information for shipping papers and package markings. Under the provisions of subparts C and D of this part, the technical name of the constituent which makes the product a hazardous material may be required in association with the proper shipping name.
(iii) Multiple hazard materials. If a material meets the definition of more than one hazard class, and is not identified in the Table by a specific description, the hazard class of the material shall be determined by using the precedence specified in 173.2a of this subchapter, and appropriate shipping description (e.g., "Flammable liquid, corrosive n.o.s.") shall be selected as described in paragraph (c)(12)(ii) of this section. Except for a pesticide, a subsidiary hazard of Division 6.1 Packing Group III, need not be considered for selecting a shipping description.
(iv) If it is specifically determined that a material is not a forbidden material and does not meet the definition of any hazard class, the material is not a hazardous material.

49CFR 172 Part 200

Applicability.

(a) Description of hazardous materials required. Except as otherwise provided in this subpart, 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 waste or a hazardous substance, that is--

13.0 PACKAGING AND TRANSPORTATION

(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.

49CFR 172 Part 201

General entries.

(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 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. (49 U.S.C. 1803, 1804, 1808; 49 CFR 1.53, app. A to part 1)

49CFR 172 Part 202

Description of hazardous material on shipping papers.

(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 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 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,'' may 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. (49 U.S.C. 1803, 1804, 1808; 49 CFR 1.53, app. A to part 1)

49CFR 172 Part 203(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.

49CFR 172 Part 203(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 the Appendix A to 171.101; or
(ii) 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)".

49CFR 172 Part 203(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 radioactive material that is listed in 173.435 of this subchapter. Abbreviations, e.g., "99Mo" 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).

13.0 PACKAGING AND TRANSPORTATION

(4) The activity contained in each package of the shipment in terms of curies, millicuries, or microcuries. Abbreviations are authorized. For the shipment of a package containing a highway route controlled quantity of radioactive materials (see 173.403(1) 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 radioactive materials:
(i) The words "Fissile Exempt," if the package is exempt pursuant to 173.453 of this subchapter, or
(ii) If not exempt, the fissile class of each package in the shipment, pursuant to 173.455 of this subchapter; and
(iii) For a Fissile Class III shipment, the additional notation: "Warning-Fissile Class III Shipment. Do not Load More Than *** Packages per Vehicle." (Asterisks to be replaced by appropriate number.) "In loading and Storage Areas, Keep at Least 20 Feet (6 Meters), from Other Packages Bearing Radioactive Labels."
(iv) If a Fissile Class III shipment is to be transported by water, the supplementary notation must also include the following statement. "For shipment by water, only one Fissile Class III 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.)

49CFR 172 Part 203(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.

49CFR 172 Part 203(k) Paragraph 1

Technical names for "n.o.s." and other generic descriptions. Unless otherwise excepted, if a material is described on a shipping paper by one of the proper shipping names listed in paragraph (k)(3) of this section the technical name of the hazardous material must be entered in parentheses, in association with the basic description. For example, "Corrosive liquid, n.o.s., (Caprylyl chloride), 8, UN 1760, II", or (contains caprylyl chloride)". The word "contains" may be used in association with the technical name, if appropriate. For organic peroxides which may qualify for more than one generic listing depending on concentration, the technical name must include the actual concentration being shipped or the concentration range for the appropriate generic listing. For example, "Organic peroxide type B, solid, 5.2, UN 3102 (dibenzoyl peroxide, 52-100%)" or "Organic peroxide type E, solid, 5.2, UN 3108 (dibenzoyl peroxide, paste, less than 52%)."

49CFR 172 Part 203(k)(1)

In addition to the n.o.s. descriptions herein, the requirements of this section apply to all shipping descriptions for poisonous materials which are subject to the requirements of paragraph (m) of this section, and for which the proper shipping name does not specifically identify the poisonous constituent by technical name. For example, "Motor fuel antiknock mixtures (Tetraethyl lead), 6.1, UN 1649, I", or "Motor fuel antiknock mixtures, 6.1, UN 1649, I (Tetraethyl lead)."

49CFR 172 Part 203(k)(2)

If a hazardous material is a mixture or solution of two or more hazardous materials, the technical names of at least two components most predominately contributing to the hazards of the mixture or solution must be entered on the shipping paper as required by paragraph (k) of this section. For example, "Flammable liquid, corrosive, n.o.s., 3, UN 2924, II (contains Methanol, Potassium hydroxide)".

WA7890008967-DW Part I.E.17.b.

For dangerous waste which is being transported within the Facility (i.e., shipment of on-site generated dangerous waste), whenever a significant

13.0 PACKAGING AND TRANSPORTATION

discrepancy in the shipping papers (see Condition II.Q.1.) is discovered, the Permittees shall attempt to reconcile the discrepancy. If not reconciled within 15 days of discovery, the Permittees shall submit a letter report, including a copy of the applicable manifest or shipping paper, to the Department.

13.2.9 Notification of State Authorities of Shipments of High-Hazard Materials

10CFR 71 Part 97

Advance notification of shipment of nuclear waste.

(a) Except as specified in paragraph (b) of this section, prior to the transport or delivery to a carrier for transport of licensed material outside the confines of the licensee's plant or other place of use or storage, each licensee shall provide advance notification to the governor of a state, or the governor's designee, of the shipment to, through, or across the boundry of the state.

(b) Advance notification is required only when:

(1) The licensed material is required by this part to be in Type B packaging for transportation;
(2) The licensed material other than irradiated fuel is being transported to, through, or across state boundaries to a disposal site or to a collection point for transport to a disposal site;
(3) The quantity of licensed material in a single package exceeds:
(i) 5,000 curies of special form radionuclides;
(ii) 5,000 curies of uncompressed gases of Argon 41, Krypton 85m, Krypton 87, Xenon 131m, or Xenon 135;
(iii) 50,000 curies of Argon 37, or of uncompressed gases of Krypton 85 or Xenon 133, or of Hydrogen 3 as a gas, as luminous paint, or adsorbed on solid material;
(iv) 20 curies of other non-special form radionuclides for which A is less than or equal to four curies; or
(v) 200 curies of other non-special form radionuclides for which A is greater than four curies; and
(4) The quantity of irradiated fuel is less than that subject to advance notification requirements of 10 CFR part 73.

(c) Procedures for submitting advance notification.

(1) The notification must be made in writing to the office of each appropriate governor or governor's designee and to the Regional Administrator of the appropriate Nuclear Regulatory Commission Regional Office listed in appendix A of part 73 of this chapter.
(2) A notification delivered by mail must be postmarked at least seven days before the beginning of the seven-day period during which departure of the shipment is estimated to occur.
(3) A notification delivered by messenger must reach the office of the governor or of the governor's designee at least four days before the beginning of the seven-day period during which departure of the shipment is estimated to occur.
(i) A list of the names and mailing addresses of the governors' designees receiving advance notification of transportation of nuclear waste was published in the Federal Register on June 30, 1983 (48 FR 30221).
(ii) The list will be published annually in the Federal Register on or about June 30 to reflect any changes in information.
(iii) A list of the names and mailing addresses of the governors' designees is available upon request from the Director, Office of Governmental and Public Affairs, U.S. Nuclear Regulatory Commission, Washington, DC 20555.
(4) The licensee shall retain a copy of the notification as a record for three years.

(d) Information to be furnished in advance notification of shipment. Each advance notification of shipment of nuclear waste must contain the following information:

(1) The name, address, and telephone number of the shipper, carrier, and receiver of the nuclear waste shipment;
(2) A description of the nuclear waste contained in the shipment, as required by the regulations of DOT in 49 CFR 172.202 and 172.203(d);
(3) The point of origin of the shipment and the seven-day period during which departure of the shipment is estimated to occur;
(4) The seven-day period during which arrival of the shipment at state boundaries is estimated to occur;
(5) The destination of the shipment, and the seven-day period during which arrival of the shipment is estimated to occur; and
(6) A point of contact with a telephone number for current shipment information.

13.0 PACKAGING AND TRANSPORTATION

(e) Revision notice. A licensee who finds that schedule information previously furnished to a governor or governor's designee in accordance with this section will not be met, shall telephone a responsible individual in the office of the governor of the State or of the governor's designee and inform that individual of the extent of the delay beyond the schedule originally reported. The licensee shall maintain a record of the name of the individual contacted for three years.

(f) Cancellation notice.

(1) Each licensee who cancels a nuclear waste shipment for which advance notification has been sent, shall send a cancellation notice to the governor of each state or the governor's designee previously notified and to the Regional Administrator of the appropriate Nuclear Regulatory Commission Regional Office listed in appendix A of part 73 of this chapter.

(2) The licensee shall state in the notice that it is a cancellation and shall identify the advance notification which is being cancelled. The licensee shall retain a copy of the notice as a record for three years.

[48 FR 35607, Aug. 5, 1983, as amended at 52 FR 31612, Aug. 21, 1987; 53 FR 19256, May 27, 1988]

13.2.10 Emergency Response Information

49CFR 172 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;

(2) Available for use away from the package containing the hazardous material; and

(3) PresentedÄ

(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

13.0 PACKAGING AND TRANSPORTATION

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.

49CFR 172 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 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 172; 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.

13.0 PACKAGING AND TRANSPORTATION

13.2.12 Loading Operations

DOE1540.1A Chapter II, Section 4.b(1)(c)

Acceptable Practices. The following represents a composite of acceptable practices which should be applied to assure a successful program.

Loading.

(c) Reasonable precautions such as wheel chocking shall be taken to prevent motion of the conveyance during the loading or unloading process.

DOE1540.1A Chapter II, Section 4.b(1)(e)

Acceptable Practices. The following represents a composite of acceptable practices which should be applied to assure a successful program.

Loading.

(e) The loading device used to load or unload a shipment shall be appropriate for the dimensions and weight of the package. Loading devices which may possibly damage any packages of a shipment shall not be used.

13.2.13.1 Dangerous Waste Transportation

WA7890008967-DW Part II.Q.2.

All non-containerized solid, dangerous waste transported to or from TSD units subject to this Permit shall be covered such that no material can escape during transport.

WAC-173-303 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 shall have a current EPA/state identification number (EPA/state ID No.). 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 No., or whose EPA/state ID No. has been cancelled or withdrawn, shall be in violation of this regulation.

13.2.13.2 Miscellaneous Requirements

49CFR 171 Part 3

(a) No person may offer for transportation or transport a hazardous waste (as defined in 171.8 of this subchapter) in interstate or intrastate commerce except in accordance with the requirements of this subchapter.

(b) No person may accept for transportation, transport, or deliver a hazardous waste for which a manifest is required unless that person:

(1) Has marked each motor vehicle used to transport hazardous waste in accordance with 390.21 or 1058.2 of this title even though placards may not be required;

(2) Complies with the requirements for manifests set forth in 172.205 of this subchapter; and

(3) Delivers, as designated on the manifest by the generator, the entire quantity of the waste received from the generator or a transporter to:

(i) The designated facility or, if not possible, to the designated alternate facility;

(ii) The designated subsequent carrier; or

(iii) A designated place outside the United States. Note: Federal law specifies penalties up to $25,000 fine and 5 years imprisonment for the willful discharge of hazardous waste at other than designated facilities. 49 U.S.C. 1809.

13.0 PACKAGING AND TRANSPORTATION

(c) With regard to hazardous waste subject to this subchapter, any requirement of a state or its political subdivision is inconsistent with this subchapter if it applies because that material is a waste material and applies differently from or in addition to the requirements of this subchapter concerning:

(1) Packaging, marking, labeling, or placarding;

(2) Format or contents of discharge reports (except immediate reports for emergency response); and

(3) Format or contents of shipping papers, including hazardous waste manifests.

Note: See 172.205; each manifest must be prepared in accordance with 40 CFR 262.20 including the instructions and limitations specified for preparation of a manifest.

(d) If a discharge of hazardous waste or other hazardous material occurs during transportation, and an official of a State or local government or a Federal agency, acting within the scope of his official responsibilities, determines that immediate removal of the waste is necessary to prevent further consequence, that official may authorize the removal of the waste without the preparation of a manifest. [Note: In such cases, EPA does not require carriers to have EPA identification numbers.]

Note 1: EPA requires shippers (generators) and carriers (transporters) of hazardous wastes to have identification numbers which must be displayed on hazardous waste manifests. See 40 CFR parts 262 and 263. (Identification number application forms may be obtained from EPA regional offices.)

Note 2: In 40 CFR part 263, the EPA sets forth requirements for the cleanup of releases of hazardous wastes.

13.2.13.2.1 Bracing

DOE1540.1A Chapter II, Section 4.b(2)

Acceptable Practices. The following represents a composite of acceptable practices which should be applied to assure a successful program.

Blocking and Bracing

Packages shall be blocked and braced on or in the conveyance to prevent shifting or changing of position during normal transportation conditions, and to remain stable after the restraints are removed. For motor freight, carriers and shippers shall observe the provisions of 49 CFR 393.104.

13.2.13.2.2 Quality Assurance/Quality Control

49CFR 173 Part 475

Quality control requirements prior to each shipment of radioactive materials.

Before each shipment of any radioactive materials package, the shipper shall 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 0.25 atmosphere, absolute, (0.25 kilograms per square centimeter or 3.6 psia). The test must

13.0 PACKAGING AND TRANSPORTATION

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.

DOE1540.2 Chapter X, Section 2.b

Requirements
Users shall ensure that packaging constructed in accordance with the DOT specifications meet the current requirements.

(1) Packaging procured from commercial sources must be certified by the manufacturer that the packaging meets all applicable specifications.
(2) It is the responsibility of the user to ensure that adequate documentation is developed and maintained for new specification packaging constructed for their use. All documentation should be available for audit.

DOE5480.3 Section 10.a

Operating Procedures.
Establishment and Maintenance of Procedures. The shipper shall establish and maintain:
(1) Operating procedures adequate to assure that the determinations and controls required by this section are accomplished.
(2) Regular and periodic inspection procedures adequate to assure that the procedures required by paragraph 10.a.(1), above, are followed.

DOE5480.3 Section 10.d

Routine Determinations.
Prior to each use of a package for shipment of radioactive or fissile materials, the shipper shall ascertain that the package with its contents satisfies the applicable requirements of paragraph 8, including determination that:
(1) The packaging has not been significantly damaged.
(2) Any moderators and nonfissile neutron absorbers, if required, are as authorized.
(3) The closure of the package and any sealing gaskets present are free from defects.
(4) Any valve through which primary coolant can flow is protected against tampering.
(5) The internal gauge pressure of the package will not exceed, during the anticipated period of transport, the maximum normal operating pressure.
(6) Contamination of the primary coolant will not exceed, during the anticipated period of transport, the limits as prescribed in paragraph 8.e.(1)(d).

DOE5480.3 Section 10.e

e. Records. The shipper shall maintain for 2 years or more a record of each shipment of fissile material and each shipment of amounts of radioactive material greater than Type A quantities in single packages, showing where applicable:

(1) Identification of the packaging by model number and the number of the certificate of compliance.

(2) Details of any significant defects in the packaging, with the means employed to repair the defects and prevent their recurrence.

(3) Volume and identification of coolant.

(4) Type and quantity of material in each package, and the total quantity in each shipment.

(5) For each item of irradiated fissile material:

(a) Identification by model number.

(b) Irradiation and decay history to the extent appropriate to demonstrate that its nuclear and thermal characteristics comply with appropriate conditions.

13.0 PACKAGING AND TRANSPORTATION

(c) Any abnormal or unusual condition relevant to radiation safety.

(6) Date of the shipment.

(7) For Fissile Class III, any special controls exercised.

(8) Name and address of the transferee.

(9) Address to which shipment was made.

(10) Results of the determination required by paragraphs 10c and 10d, above.

13.2.13.2.3 Equipment Inspection

DOE1540.1A Chapter II, Section 4.b(1)(b)

Acceptable Practices. The following represents a composite of acceptable practices which should be applied to assure a successful program.

Loading.

(b) Before a shipment is loaded upon a transport vehicle, the shipper shall visually survey the equipment externally to determine its general operating condition, its capability to transport the shipment, the existence of appropriate restraint devices in good condition, and assure the estimated gross weight of the shipment does not exceed the authorized carrying capacity of the conveyance.

13.2.13.2.4 Lifting and Tie Downs

DOE1540.1A Chapter II, Section 4.b(3)(a,b,c,d,e,f,g)

Acceptable Practices. The following represents a composite of acceptable practices which should be applied to assure a successful program.

Tiedown Assemblies

(a) For motor freight, carriers and shippers shall observe the provisions of 49 CFR 393.100-102 to restrain cargo.

(b) Elastic properties should be considered when selecting material for use in a tiedown system. For example, wire rope is preferable over chain because it is more flexible and better able to withstand the shocks of transportation.

(c) Only tiedown materials with a strength rating (working and/or ultimate) established and documented by the manufacturer shall be used. The following shall not be used as components of a tiedown system:

1 Plastic or fiber rope.

2 Any material with unknown strength.

3 Any damaged material.

(d) The principal tiedown forces should be transmitted to the vehicle frame and not to the wood or metal decking.

(e) The strength of the tiedown attachment points on the conveyance should be greater than or equal to the strength of the tiedowns themselves. In the case when the strength of the tiedowns exceeds or equals the structural design limits of the conveyance itself, the strength of the tiedown attachment points on the conveyance is limited to the structural design strength of the conveyance.

13.0 PACKAGING AND TRANSPORTATION

(f) Flexible tiedowns (wire rope, strap, chain, etc.) should be free from contact with any other stationary objects when taut to prevent chafing and damage during transport. Tiedown assemblies must be appropriately preloaded and secured so that they will not become loose during transportation. The base of the load should be blocked in place.

(g) Engineered tiedowns, such as rigid clamping with bolts and structural shapes, may be preferable over flexible tiedowns for heavy weight, high center of gravity, or high consequences packages.

DOE1540.1A Chapter II, Section 4.b(3)(i,j)

Acceptable Practices. The following represents a composite of acceptable practices which should be applied to assure a successful program.

Tiedown Assemblies

(i) Exposure of the tiedown components to dirt, weather extremes, water, or corrosives may reduce their strength, so these conditions should be avoided if possible. Use caution to avoid kinking, crimping, or splaying wire rope. Repairs shall not be attempted on wire rope, straps, or chains, unless a documented rating of the strength can be established by test following the repair.

(j) The load shall be inspected thoroughly by the shipper and carrier prior to release of the shipment. The shipper should ensure that the carrier recognizes his or her responsibility to check the tiedowns periodically during transit, and tighten them as necessary.

13.2.13.2.5 Weight Limitations

DOE1540.1A Chapter II, Section 4.b(1)(g)

Acceptable Practices. The following represents a composite of acceptable practices which should be applied to assure a successful program.

Loading.

(g) The shipment must be positioned on the conveyance in such a way that the weight is equally distributed over the width and length of the conveyance. For rail and motor freight shipments, the load should be positioned as equally as possible among the vehicle's axles. The location of attachment points for tiedown members shall be selected accordingly. Proper placement of the load on the vehicle to avoid exceeding maximum allowable axle loadings is the responsibility of the carrier.

13.3.4 Physical Protection for Security

49CFR 397 Part 101(f)

A person may transport irradiated reactor fuel only in compliance with a plan if required under 49 CFR 173.22(c) that will ensure the physical security of the material. Variation for security purposes from the requirements of this section is permitted so far as necessary to meet the requirements imposed under such a plan, or otherwise imposed by the U.S. Nuclear Regulatory Commission in 10 CFR part 73.

13.5.1 Training and Qualification

49CFR 172 Part 702

Applicability and responsibility for
training and testing.

(a) A hazmat employer shall ensure that each of its hazmat employees is trained in accordance with the requirements prescribed in this subpart.

(b) A hazmat employee who performs any function subject to the requirements of this subchapter may not perform that function unless trained in accordance with the requirements prescribed in this subpart. It is the duty of each hazmat employer to comply with the applicable requirements of this subchapter and to thoroughly instruct each hazmat employee in relation thereto.

(c) Training may be provided by the hazmat employer or other public or private sources.

(d) A hazmat employer shall ensure that each of its hazmat employees is tested by appropriate means on the training subjects

13.0 PACKAGING AND TRANSPORTATION

covered in 172.704.

49CFR 172 Part 704

Training requirements.

(a) Hazmat employee training shall include the following:

(1) General awareness/familiarization training. Each hazmat employee shall receive general awareness/familiarization training designed to provide familiarity with the requirements of this subchapter and to enable the employee to recognize and identify hazardous materials consistent with the hazard communication standards of this subchapter.

(2) Function-specific training.

(i) Each hazmat employee shall receive function-specific training concerning requirements of this subchapter which are specifically applicable to the functions the employee performs.

(ii) Training conducted by hazmat employers, as necessary, to comply with, and when subject to, the requirements of the ICAO Technical Instructions or the IMDG Code, as authorized in 171.11 and 171.12 of this subchapter, respectively, may be used, when appropriate, to the extent they serve as a substitute for the requirements of this section.

(3) Safety training. Each hazmat employee shall receive safety training concerning-

(i) Emergency response information required by subpart G of part 172;

(ii) Measures to protect the employee from the hazards associated with hazardous materials to which they may be exposed in the work place, including specific measures the hazmat employer has implemented to protect employees from exposure; and

(iii) Methods and procedures for avoiding accidents, such as the proper procedures for handling packages containing hazardous materials.

(b) OSHA or EPA Training. Training conducted by employers to comply with the hazard communication programs required by the Occupational Safety and Health Administration (OSHA) of the Department of Labor (29 CFR 1910.120) or the Environmental Protection Agency (EPA) (40 CFR 311.1), to the extent that training addresses the training specified in paragraph (a) of this section, may be used to satisfy the training requirements in paragraph (a) of this section, in order to avoid unnecessary duplication of training.

(c) Initial and recurrent training.-

(1) Initial training. Each hazmat employer shall train each hazmat employee as follows:

(i) Training for a hazmat employee employed on or before November 15, 1992, shall be completed prior to April 1, 1993.

(ii) Training for a hazmat employee employed after November 15, 1992, shall be completed within 90 days after employment.

(iii) A hazmat employee who changes hazardous materials job functions shall complete training in the new job function(s) within 90 days after the change.

(iv) A hazmat employee described in paragraph (c)(1) (ii) or (iii) of this section, may perform new hazardous materials job functions prior to the completion of training provided the employee performs those functions under the supervision of a properly trained and knowledgeable hazmat employee.

(2) Recurrent Training. A hazmat employee shall receive the training required by this subpart at least once every two years.

13.0 PACKAGING AND TRANSPORTATION

(3) Relevant Training. Relevant training received from a previous employer or other source may be used to satisfy the requirements of this subpart provided a current record of training is obtained from hazmat employees' previous employer.

(4) Compliance. Each hazmat employer is responsible for compliance with the requirements of this subchapter regardless of whether the training required by this subpart has been completed.

(d) Recordkeeping. A record of current training, inclusive of the preceding two years, in accordance with this subpart shall be created and retained by each hazmat employer for each hazmat employee for as long as that employee is employed by that employer as a hazmat employee and for 90 days thereafter. The record shall include:

(1) The hazmat employee's name;

(2) The most recent training completion date of the hazmat employee's training;

(3) A description, copy, or the location of the training materials used to meet the requirements in paragraph (a) of this section;

(4) The name and address of the person providing the training; and

(5) Certification that the hazmat employee has been trained and tested, as required by this subpart.

(e) Limitation. A hazmat employee who repairs, modifies, reconditions, or tests packagings as qualified for use in the transportation of hazardous materials, and who does not perform any other function subject to the requirements of this subchapter, is not subject to the safety training requirement of paragraph (a)(3) of this section. Pt. 172, App. A

WAC-173-303 Section 330(1)

Training program. The facility owner or operator shall 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 shall include those elements set forth in the training plan required in subsection (2) of this section. In addition:
(a) The training program shall 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;

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

(c) This program must be successfully completed by the facility personnel:

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

(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

(d) At a minimum, the training program shall familiarize facility personnel with emergency equipment and systems, and emergency procedures. The program shall include other parameters as set forth by the department, but at a minimum shall 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;

13.0 PACKAGING AND TRANSPORTATION

(iv) Response to fires or explosions;

(v) Response to ground-water contamination incidents; and

(vi) Shutdown of operations.

WAC-173-303 Section 330(2)

Written training plan. The owner or operator shall 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.

WAC-173-303 Section 330(3)

Training records. Training records on current personnel must be kept until closure of the facility. Training records on former employees must be kept for at least three years from the date the employees last worked at the facility. Personnel training records may accompany personnel transferred within the same company.

13.5.9 Reporting

DOE5000.3B Group 6

Shippers are responsible for occurrences involving their shipments. DOE organizations receiving hazardous materials, which are not in compliance with appropriate requirements, from a DOE shipper must report the discrepancies to the DOE shipper who will prepare Notification and Occurrences Reports in accordance with this Order and implement suitable corrective actions. If an out-of-compliance shipment is received from a non-DOE shipper, the DOE-recipient shall notify the non-DOE shipper of the discrepancy and shall prepare Notification and Occurrence Reports in accordance with this Order. These reports must contain a statement that the non-DOE shipper has been notified and identify any corrective actions taken or planned to eliminate the occurrence from being repeated.

The term "limited quantity" as used in this Group is defined 49 CFR 171.8.

A. Offsite Transportation (DOT jurisdiction) Occurrences.

Emergency

An offsite transportation event involving the release of a reportable quantity of a hazardous substance (per 49 CFR 171.8) which is transported in support of Departmental operations.

Unusual Occurrence

(a) An offsite transportation event involving the release of hazardous material (per 49 CFR 171.8), other than radioactive material, in an amount greater than a limited quantity (per 49 CFR 171.8) transported in support of Departmental operations.

(b) An offsite transportation event involving the release of radioactive material transported in support of departmental operations.

(c) Any radioactive material shipment transported offsite that arrives at its destination with radiation or contamination levels in excess of DOT allowable limits.

13.0 PACKAGING AND TRANSPORTATION

(d) Any shipment of radioactive material or hazardous waste that arrives at its destination with a nonreconcilable shipping paper discrepancy or unaccounted for package (e.g., actual number of packages inconsistent with number indicated on shipping papers) related to material quantity.

(e) Any violation of Department of Transportation (DOT) Federal Motor Carrier Safety Regulations or Federal Aviation Agency (FAA) Regulations contributing to a transportation event involving a release of hazardous material.

Off-Normal

(a) An offsite transportation event involving a release of hazardous material (per 49 CFR 171.8) other than radioactive material, not exceeding a limited quantity (per 49 CFR 171.8) transported in support of Departmental operations.

(b) Any other violation of regulatory requirements involving improper material descriptions, marking, labeling, placarding, routing, or separation/segregation of hazardous materials that could or does result in:

(1) improper handling/storage;

(2) personnel exposures higher than permitted; or

(3) emergency response actions inconsistent with the actual hazard.

(c) Any violation of DOT Federal Motor Carrier Safety Regulations or FAA Regulations.

(d) Evidence of improper classification of hazardous materials transported offsite.

(e) Evidence of improper selection or assembly of a hazardous material package transported offsite.

(f) Evidence that cargo has shifted during transport offsite.

(g) Transportation activities that are performed by unqualified personnel.

(h) Any transportation event involving Departmental property resulting in vehicular/aircraft damage of more than $5000 or, for insurance purposes, considered a total loss.

B. Onsite Transportation (DOE jurisdiction) Occurrences.

Unusual Occurrence

(a) An onsite transportation event involving the release of a reportable quantity of a hazardous substance (per 49 CFR 171.8) which is transported in support of Departmental operations.

(b) An offsite transportation event involving the release of radioactive material greater than an excepted quantity [per 49 CFR 173.421-1(a)] transported in support of Departmental operations.

(c) An onsite transportation event involving the release of hazardous material (per 49 CFR 171.8) transported in support of Departmental operations.

Off Normal

(a) An onsite transportation event involving a release of hazardous material (per 49 CFR 171.8), other than radioactive material, not exceeding a limited quantity (per 49 CFR 171.8) transported in support of Departmental operations.

13.0 PACKAGING AND TRANSPORTATION

(b) An onsite transportation event involving the release of radioactive material not exceeding an excepted quantity [per 49 CFR 173.421-1(a)] transported in support of Departmental operations.

(c) Any other violation of DOE requirements involving improper material descriptions, marking, labeling, placarding, routing, or separation/segregation of hazardous materials that could result in:

(1) improper handling/storage;

(2) personnel exposures higher than permitted; or,

(3) emergency response actions inconsistent with the actual hazard.

(d) Any transportation event involving Departmental property resulting in vehicular/aircraft damage of more than $5000 or, for insurance purposes, considered a total loss.

WAC-173-303 Section 145

Spills and discharges into the environment

145 (1) Purpose and applicability. This section sets forth the requirements for any person responsible for a spill or discharge, except when such release is otherwise permitted under state or federal law. For the purposes of complying with this section, a transporter who spills or discharges dangerous waste or hazardous substances during transportation will be considered the responsible person. This section shall apply when any dangerous waste or hazardous substance is intentionally or accidentally spilled or discharged (unless otherwise permitted), regardless of the quantity of dangerous waste or hazardous substance.

145 (2) Notification. Any person who is responsible for a nonpermitted spill or discharge shall immediately notify the individuals and authorities described for the following situations:

145 (2) (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; and

145 (2) (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.

(145) (2) (d) In lieu of notification under (c) of this subsection, for spills or discharges below ten gallons occurring and contained in secondary containment meeting the requirements of this chapter, a brief account must immediately be entered into the operating record, for a TSD facility, or into the inspection log or separate spill log, for a generator. This account must include: The time and date of the spill; the location and cause of the spill; the type and quantity of material spilled; and a brief description of any response actions taken or planned.

145 (3) Mitigation and control. The person responsible for a nonpermitted spill or discharge shall take appropriate immediate action to protect human health and the environment (e.g., diking to prevent contamination of state waters, shutting of open valves).

145 (3) (a) In addition, the department may require the person responsible for a spill or discharge to:

145 (3) (i) Clean up all released dangerous wastes or hazardous substances, or to 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,

13.0 PACKAGING AND TRANSPORTATION

the human and environmental circumstances of the incident, and protection required by the Water Pollution Control Act, chapter 90.48 RCW;

145 (3) (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

145 (3) (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.

145 (3) (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.

145 (4) Nothing in WAC 173-303-145 shall eliminate any obligations to comply with reporting requirements which may exist in a permit or under other state or federal regulations.

16.0 WASTE MANAGEMENT

16.0 WASTE MANAGEMENT

16.1.3 Waste Characterization & Certification - TRU Waste

DOE5820.2A Chapter II, Section 3.a(1)

Waste Classification

(1) Any material that is known to be, or suspected of being contaminated with transuranium radionuclides shall be evaluated as soon as possible in the generating process, and determined to be either recoverable material, transuranic waste, low-level waste, mixed waste, or non-radioactive trash in order to avoid commingling the various material streams.

DOE5820.2A 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.

DOE5820.2A 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.

DOE5820.2A 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.

16.1.4 Waste Characterization & Certification - Low-Level Radioactive Waste

DOE5820.2A Chapter III, Section 3.d(1)

Waste Characterization

(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.

DOE5820.2A 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.

DOE5820.2A Chapter III, Section 3.d(3)

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.

DOE5820.2A 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 non-conformance.

16.0 WASTE MANAGEMENT

16.1.5 Waste Characterization & Certification - Mixed/Dangerous Waste

40CFR 262 Part 11

Hazardous waste determination. A person who generates a solid waste, as defined in 40 CFR 261.2 must determine if that waste is a hazardous waste using the following method:

40CFR 262 Part 11(a)

He should first determine if the waste is excluded from regulation under 40 CFR 261.4.

40CFR 262 Part 11(b)

He must then determine if the waste is listed as a hazardous waste in subpart D of 40 CFR 261.

40CFR 262 Part 11(c)

For purposes of compliance with 40 CFR part 268, or if the waste is not listed in subpart D of 40 CFR part 268, or if the waste is not listed in subpart D of 40 CFR 261, the generator must then determine whether the waste is identified in subpart C of 40 CFR 261 by either:

40CFR 262 Part 11(c)(1)

Testing the waste according to the methods set forth in subpart C of 40 CFR 261, or according to an equivalent method approved by the Administrator under 40 CFR 260.21; or

40CFR 262 Part 11(c)(2)

Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.

40CFR 262 Part 11(d)

If the waste is determined to be hazardous, the generator must refer to parts 264, 265, and 268 of this chapter for possible exclusions or restrictions pertaining to management of his specific waste.

WAC-173-303 Section 070(3)

(3) Designation procedures.

(a) To determine whether or not a waste is designated a person shall check the waste against the following sections, and in the following order: (i) First, Discarded chemical products, WAC 173-303-081;

(ii) Second, Dangerous waste sources, WAC 173-303-082;
(iii) Third, Dangerous waste characteristics, WAC 173-303-090; and (iv) Fourth, Dangerous waste criteria, WAC 173-303-100.

(b) A person shall check each section, in the order set forth, until he determines whether the waste is designated as a dangerous waste. Once the waste is designated through the lists, characteristics, or criteria he need not determine any other designations for the waste, except as required by subsection (4) or (5) of this section, or for the purposes of compliance with the federal land disposal restrictions, as adopted by reference in WAC 173-303-140. If the designation procedures identify a waste as both EHW and DW (e.g., a waste may be DW for corrosivity and EHW for toxicity characteristic), the waste must be designated EHW. 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 shall 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 shall 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

16.0 WASTE MANAGEMENT

(B) All data and records supporting this determination in accordance with WAC 173-303-210(3) are retained on-site.

WAC-173-303 Section 070(4)

(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 he shall be subject to the applicable requirements of this chapter 173-303 WAC. The department shall 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.

WAC-173-303 Section 081(1)

(1) A waste shall 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;

(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 acutely dangerous 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.

WAC-173-303 Section 081(2)

(2) Quantity exclusion limits:

(a) A person with a waste or wastes (including residues from the management of wastes) identified in subsection (1) of this section, shall be a dangerous waste generator (and may not be considered a small quantity generator as provided in WAC 173-303-070(8)) if the amount of his

16.0 WASTE MANAGEMENT

waste exceeds the following quantity exclusion limits:

(i) For chemicals designated on the acutely dangerous chemical products list of WAC 173-303-9903 - 2.2 lbs. (1.0 kg) per month or per batch. Such wastes are designated EHW;
(ii) For chemicals and for residues from the cleanup of spills involving chemicals designated on the moderately dangerous chemical products list of WAC 173-303-9903 - 220 lbs. (100 kg) per month or per batch. Such wastes are designated DW;
(iii) For containers or inner liners which held any chemical designated on the acutely dangerous chemical products list of WAC 173-303-9903 - 2.2 lbs. (1.0 kg) of residue remaining in the containers or inner liners per month or per batch unless the containers or inner liners meet the definition of empty and have been triple rinsed as described in WAC 173-303-160(2); (iv) For residues, contaminated soil, water, or other debris from the cleanup of a spill of any chemical designated on the acutely dangerous chemical products list of WAC 173-303-9903 - 220 lbs. (100 kg) per month or per batch. Such wastes are designated EHW.

(b) A person's total monthly waste quantity shall be the sum of all his wastes which share a common quantity exclusion limit (e.g., the total quantity of all EHW discarded chemical products, the total quantity of all residues contaminated by EHW discarded chemical products, etc.) which were generated during a month or a batch operation at each specific waste generation site.

WAC-173-303 Section 081(3)

(3) Dangerous waste numbers and mixtures. A waste which has been designated as a discarded chemical product dangerous waste shall 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 shall be designated. The mixture designation shall be 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; EHW designation) and 22 lbs. (10 kg) of a solid waste, would be designated as an EHW, and would have the dangerous waste number P004.

WAC-173-303 Section 082(1)

The dangerous waste sources list appears in WAC 173-303-9904. Any waste which is listed or which is a residue from the management of a waste listed on the dangerous waste sources list shall be designated a dangerous waste, and shall be identified as DW, except that WAC 173-303-9904 includes several footnotes describing circumstances under which certain dangerous waste sources should be designated EHW rather than DW.

WAC-173-303 Section 082(3)

(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 shall be designated as a dangerous waste source. The mixture shall have the same designation (DW or EHW), and shall have the same dangerous waste number as the dangerous waste source which was mixed with the solid waste.

WAC-173-303 Section 082(4)

(4) For the purposes of this section, any dangerous waste source listed in WAC 173-303-9904 which lists more than one chemical compound must be designated as a dangerous waste if it contains any one or any combination of the listed chemical compounds. For example, a spent nonhalogenated solvent containing both xylene and acetone must be designated as dangerous waste source F003.

WAC-173-303 Section 082(5)

(5) 40 CFR Part 261 Appendix VII Basis for Listing Hazardous Waste is adopted by reference.

WAC-173-303 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.

WAC-173-303 Section 090(3)

Equivalent test methods. The testing methods specified in this section shall be the only acceptable methods, unless the department approves an equivalent test method in accordance with WAC 173-303-910(2).

16.0 WASTE MANAGEMENT

WAC-173-303 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 shall be 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 his waste exceeds 220 lbs. (100 kg) per month or per batch.

WAC-173-303 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 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 that characteristic of ignitability shall be designated DW, and shall be assigned the dangerous waste number D001.

WAC-173-303 Section 090(6)

(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).

WAC-173-303 Section 090(7)

(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.

WAC-173-303 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 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 purposes of this subsection.

(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. Two levels of concentration are established for the contaminants listed. Any waste containing one or more contaminants with concentrations at or above the EHW threshold shall cause that waste to be designated EHW. Any waste containing contaminants which occur at concentrations at or above the DW threshold only (i.e., no EHW contaminants), shall be designated DW.

TOXICITY CHARACTERISTICS LIST:

Maximum Concentration of Contaminants for the Toxicity Characteristic

WAC-173-303 Section 110(2)

Representative samples.

(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 D1452-65;
(v) Soil or rock-like material - ASTM Standard D420-69;
(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).

(b) Copies of these representative sampling methods are available from the department except for the ASTM standards which can be obtained by writing to:

ASTM
1916 Race Street
Philadelphia, PA 19103.

16.0 WASTE MANAGEMENT

WAC-173-303 Section 110(5)

(5) 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.

WAC-173-303 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.

(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.) shall 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.

(3) For the purposes of designation, quantities of continuously generated wastes shall be summed monthly. All wastes generated less frequently than once a month shall be considered as batch or single event wastes.

WAC-173-303 Section 170

(1) A person shall be a dangerous waste generator if his solid waste is designated by the requirements of WAC 173-303-070 through 173-303-100.

(a) The generator shall be responsible for designating his waste as DW or EHW.

(b) The generator may request an exemption for his dangerous waste according to the procedures of WAC 173-303-072.

(2) A dangerous waste generator shall notify the department and obtain an EPA/state identification number as required by WAC 173-303-060, and shall comply with the requirements of WAC 173-303-170 through 173-303-230.

(3) Any generator who stores, treats, or disposes of dangerous waste on-site shall perform his operations in accordance with the TSD facility requirements with the following exceptions:

(a) Generators who accumulate dangerous wastes for less than ninety days as allowed under WAC 173-303-200 or for less than one hundred eighty days as allowed under WAC 173-303-201 and 173-303-202;

(b) Generators who treat dangerous waste on-site in accumulation tanks and containers provided that the generator maintains a log showing the date and amount of waste treated and complies with:

(i) WAC 173-303-200 or 173-303-201, and for tanks, WAC 173-303-202; and
(ii) WAC 173-303-283(3);

(c) Generators who treat special waste in units other than accumulation tanks or containers provided:

(i) The treatment occurs within the appropriate accumulation time frame;
(ii) The unit is designed, constructed, and operated in a manner that prevents:

(A) A release of waste and waste constituents to the environment;
(B) Endangerment of health of employees or the public;
(C) Excessive noise;

16.0 WASTE MANAGEMENT

(D) Negative aesthetic impact on the use of adjacent property.

(iii) The treatment unit must also be inspected routinely for deterioration that would lead to a release and repairs must be conducted promptly.

(4) The generator of a special waste may, upon approval by the department, for special waste only:

(a) Develop and implement an alternative manifest mechanism in lieu of the requirements of WAC 173-303-180 for special waste shipments. Such alternative mechanism might employ a single manifest for multiple shipments of the same special waste, might not require signatures or multiple copies for transporters or designated receiving facilities, and might include such other factors as the generator might develop and the department approve. The generator must, however, demonstrate to the department's satisfaction before implementing the alternative mechanism that it will assure accurate tracking and recording of waste shipments, and that the mechanism provides for the proper submission of exception reports as specified in WAC 173-303-220(2). The generator shall be responsible for assuring that all transporters and facilities involved in implementing the alternative manifest mechanism are complying with the terms and conditions of the mechanism as approved by the department, and

(b) Pursuant to the requirements of WAC 173-303-200, accumulate special waste in containers and tanks for up to one hundred eighty days, and accumulate special waste in piles for up to ninety days provided that he complies with WAC 173-303-660 (2), (3)(a), (b)(i), (ii)(A), (7), (8), and (9)(a).

(5) The generator must comply with the special land disposal restrictions for certain dangerous wastes in WAC 173-303-140.

16.1.6 Waste Characterization & Certification - Land Disposal Restrictions

40CFR 268 Part 7(a)(1)

(a) Except as specified in 268.32, if a generator's waste is listed in 40 CFR part 261, subpart DD, the generator must test his waste, or test an extract using the Toxicity Characteristic Leaching Procedure, Method 1311 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 CC, the generator must test an extract using the Extraction Procedure Toxicity Test, Method 1310 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. If the generator determines that this waste displays the characteristic of ignitability (D001) (and is not in the High TOC Ignitable Liquids Subcategory or is not treated by INCIN, FSUBS, or RORGS of 268.42, Table 1), or the characteristic of corrosivity (D002), and is prohibited under 268.37, the generator must determine what underlying hazardous constituents (as defined in 268.2) are reasonably expected to be present in the D001 or D002 waste.

(1) If a generator determines that he is managing a restricted waste under this part and the waste does not meet the applicable treatment standards set forth in subpart D of this part or exceeds the applicable prohibition levels set forth in 268.32 or RCRA 3004(d), with each shipment of waste the generator must notify the treatment or storage facility in writing of the appropriate treatment standards set forth in subpart D of this part and any applicable prohibition levels set forth in 268.32 or RCRA 3004(d). The notice must include the following information:

(i) EPA Hazardous Waste Number;

(ii) The corresponding treatment standards for wastes F001-F005, F039, wastes prohibited pursuant to 268.32 or RCRA section 3004(d), and for underlying hazardous constituents (as defined in 268.2 of this part), in D001 and D002 wastes if those wastes are prohibited under 268.37 of this part. Treatment standards for all other restricted wastes must either be included, or be referenced by including on the notification the applicable wastewater (as defined in 268.2(f)) or nonwastewater (as defined in 268.2(d)) category, the applicable subdivisions made within a waste code based on waste-specific criteria (such as D003 reactive cyanides), and the CFR section(s) and paragraph(s) where the applicable treatment standard appears. Where the applicable treatment standards are expressed as specified technologies in 268.42, the applicable five-letter treatment code found in Table 1 of 268.42 (e.g., INCIN, WETOX) also must be listed on the notification.

16.0 WASTE MANAGEMENT

(iii) The manifest number associated with the shipment of waste;

(iv) For hazardous debris, the contaminants subject to treatment as provided by 268.45(b) and the following statement: "This hazardous debris is subject to the alternative treatment standards of 40 CFR 268.45"; and

(v) Waste analysis data, where available.

40CFR 268 Part 7(a)(2)

If a generator determines that he is managing a restricted waste under this Part, and determines that the waste can be land disposed without further treatment, with each shipment of waste he must submit, to the treatment, storage, or land disposal facility, a notice and a certification stating that the waste meets the applicable treatment standards set forth in subpart D of this part and the applicable prohibition levels set forth in 268.32 or RCRA 3004(d). Generators of hazardous debris that is excluded from the definition of hazardous waste under 261.3(e)(2) of this chapter (i.e., debris that the Director has determined does not contain hazardous waste), however, are not subject to these notification and certification requirements.

(i) The notice must include the following information:

(A) EPA Hazardous Waste Number;

(B) The corresponding treatment standards for wastes F001-F005, F039, and wastes prohibited pursuant to 268.32 or RCRA section 3004(d). Treatment standards for all other restricted wastes must either be included, or be referenced by including on the notification the applicable wastewater (as defined in 268.2(f)) or nonwastewater (as defined in 268.2(d)) category, the applicable subdivisions made within a waste code based on waste-specific criteria (such as D003 reactive cyanides), and the CFR section(s) and paragraph(s) where the applicable treatment standard appears. Where the applicable treatment standards are expressed as specified technologies in 268.42, the applicable five-letter treatmen code found in Table 1 of 268.42 (e.g., INCIN, WETOX) also must be listed on the notification.

(C) The manifest number associated with the shipment of waste;

(D) Waste analysis data, where available.

(ii) The certification must be signed by an authorized representative and must state the following:

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

40CFR 268 Part 7(a)(3)

If a generator's waste is subject to an exemption from a prohibition on the type of land disposal method utilized for the waste (such as, but not limited to, a case-by-case extension under 268.5, an exemption under 268.6, or a nationwide capacity variance under subpart C), with each shipment of waste he must submit a notice to the facility receiving his waste stating that the waste is not prohibited from land disposal. The notice must include the following information:

(i) EPA Hazardous Waste Number;

(ii) The corresponding treatment standards for wastes F001-F005, F039, and wastes prohibited pursuant to 268.32 or RCRA section 3004(d). Treatment standards for all other restricted wastes must either be included, or be referenced by including on the notification the applicable wastewater (as defined in 268.2(f)) or nonwastewater (as defined in 268.2(d)) category, the applicable subdivisions made within a waste code based on waste-specific criteria (such as D003 reactive cyanides), and the CFR section(s) and paragraph(s) where the applicable treatment standard appears. Where the applicable treatment standards are expressed as specified technologies in 268.42, the applicable five-letter treatment code found in Table 1 of 268.42 (e.g., INCIN, WETOX) also must be listed on the notification.

16.0 WASTE MANAGEMENT

(iii) The manifest number associated with the shipment of waste;

(iv) Waste analysis data, where available;

(v) For hazardous debris, the contaminants subject to treatment as provided by 268.45(b) and the following statement: "This hazardous debris is subject to the alternative treatment standards of 40 CFR 268.45"; and

(vi) The date the waste is subject to the prohibitions.

40CFR 268 Part 7(a)(5)

(5) If a generator determines whether the waste is restricted based solely on his knowledge of the waste, all supporting data used to make this determination must be retained on-site in the generator's files. If a generator determines whether the waste is restricted based on testing this waste or an extract developed using the test method described in appendix I of this part, all waste analysis data must be retained on-site in the generator's files.

40CFR 268 Part 7(a)(6)

(6) If a generator determines that he is managing a restricted waste that is excluded from the definition of hazardous or solid waste or exempt from subtitle C regulation, under 40 CFR 261.2-261.6 subsequent to the point of generation, he must place a one-time notice stating such generation, subsequent exclusion from the definition of hazardous or solid waste or exemption from subtitle C regulation, and the disposition of the waste, in the facility's file.

40CFR 268 Part 7(a)(8)

If a generator is managing a lab pack that contains wastes identified in appendix IV of this part and wishes to use the alternative treatment standard under 268.42, with each shipment of waste the generator must submit a notice to the treatment facility in accordance with paragraph (a)(1) of this section. The generator must also comply with the requirements in paragraphs (a)(5) and (a)(6) of this section, and must submit the following certification, which must be signed by an authorized representative:

I certify under penalty of law that I personally have examined and am familiar with the waste and that the lab pack contains only the wastes specified in appendix IV to part 268 or solid wastes not subject to regulation under 40 CFR part 261. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine or imprisonment.

40CFR 268 Part 7(a)(9)

(9) If a generator is managing a lab pack that contains organic wastes specified in appendix V of this part and wishes to use the alternate treatment standards under 268.42, with each shipment of waste the generator must submit a notice to the treatment facility in accordance with paragraph (a)(1) of this section. The generator also must comply with the requirements in paragraphs (a)(5) and (a)(6) of this section, and must submit the following certification which must be signed by an authorized representative:

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste and that the lab pack contains only organic waste specified in appendix V to part 268 or solid wastes not subject to regulation under 40 CFR part 261. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine or imprisonment.

40CFR 268 Part 9

Special rules regarding wastes that exhibit a characteristic.

(a) The initial generator of a solid waste must determine each EPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under subpart D of this part. For purposes of part 268, the waste will carry the waste code for any applicable listing under 40 CFR part 261, subpart D. In addition, the waste will carry one or more of the waste codes under 40 CFR part 261, subpart C, where the waste exhibits a characteristic, except in the case when the treatment standard for the waste code listed in 40 CFR part 261, subpart D operates in lieu of the standard for the waste code under 40 CFR part 261, subpart C, as specified in paragraph (b) of this section. If

16.0 WASTE MANAGEMENT

the generator determines that his waste displays the characteristic of ignitability (D001) (and is not in the High TOC Ignitable Liquids Subcategory or is not treated by INCIN, FSUBS, or RORGS of 268.42, Table 1) or the characteristic of corrosivity (D002), and is prohibited under 268.37 of this Part, the generator must determine what underlying hazardous constituents (as defined in 268.2 of this Part) are reasonably expected to be present in the D001 or D002 waste.

(b) Where a prohibited waste is both listed under 40 CFR part 261, subpart D and exhibits a characteristic under 40 CFR 261 subpart C, the treatment standard for the waste code listed in 40CFR part 261, subpart D will operate in lieu of the standard for the waste code under 40 CFR part 261, subpart C, provided that the treatment standard for the listed waste includes a treatment standard for the constituent that causes the waste to exhibit the characteristic. Otherwise, the waste must meet the treatment standard for all applicable listed and characteristic waste codes.

(c) In addition to any applicable standards determined from the initial point of generation, no prohibited waste which exhibits a characteristic under 40 CFR part 261, subpart C may be land disposed unless the waste complies with the treatment standards under subpart D of this part.

(d) Wastes that exhibit a characteristic are also subject to 268.7 requirements, except that once the waste is no longer hazardous, a one-time notification and certification must be placed in the generator's or treater's files and sent to the EPA region or authorized state. The notification and certification that is placed in the generators or treaters files must be updated if the process or operation generating the waste changes and/or if the subtitle D facility receiving the waste changes. However, the generator or treater need only notify the EPA region or an authorized state on an annual basis if such changes occur. Such notification and certification should be sent to the EPA region or authorized state by the end of the calendar year, but no later than December 31.

(1) The notification must include the following information:

(i) Name and address of the Subtitle D facility receiving the waste shipment;

(ii) A description of the waste as initially generated, including the applicable EPA Hazardous Waste Number(s) and treatability group(s);

(iii) The treatment standards applicable to the waste at the point of generation.

(2) The certification must be signed by an authorized representative and must state the language found in 268.7(b)(5).

16.2.1 Low-Level Radioactive Waste Packaging

DOE5820.2A Chapter III, Section 3.i(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.

DOE5820.2A 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.

DOE5820.2A 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.

16.0 WASTE MANAGEMENT

DOE5820.2A 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)(c).

DOE5820.2A 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 20øC.

DOE5820.2A 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.

16.2.2 Dangerous/Mixed Waste Packaging and Labeling

WAC-173-303 Section 104(2)

(2) Characteristics. A waste which exhibits any of the dangerous waste characteristics, WAC 173-303-090, shall be assigned the dangerous waste number corresponding to the characteristic(s) exhibited by the waste.

WAC-173-303 Section 104(3)

(3) Criteria. The following table shall be used for assigning dangerous waste numbers to wastes designated by the dangerous waste criteria or by WAC 173-303-084.

generic dangerous waste numbers table

Dangerous Waste #	Dangerous Waste Criteria and Designation
	Toxic Dangerous Wastes
WT01	EHW
WT02	DW
	Persistent Dangerous Wastes
	Halogenated Hydrocarbons
WP01	EHW
WP02	DW
	Polycyclic Aromatic Hydrocarbons
WP03	EHW
	Carcinogenic Dangerous Wastes
WC01	EHW
WC02	DW

WAC-173-303 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 metal shipping container (49 CFR Parts 178 and 179) of no more than 416-liter (110 gallon) capacity and surrounded by, at a minimum, a sufficient quantity of absorbent material to completely absorb all of the liquid contents of the inside containers. The metal outer container must be full after packing with inside containers and absorbent material;

(3) The absorbent material used must not be capable of reacting dangerously with, being decomposed by, or being ignited by the contents of the

16.0 WASTE MANAGEMENT

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 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.

WAC-173-303 Section 180(1)

Before transporting dangerous waste or offering dangerous waste for transport off the site of generation, the generator shall prepare a manifest and shall follow all applicable procedures described in this section.

(1) This subsection describes the form and contents of dangerous waste manifests. 40 CFR Part 262 Appendix - Uniform Hazardous Waste Manifest and Instructions (EPA Forms 8700-22 and 8700-22A and Their Instructions) is adopted by reference. The manifest shall be EPA Form 8700-22 and, if necessary, EPA Form 8700-22A. The manifest must be prepared in accordance with the instructions for these forms, as described in the uniform manifest Appendix of 40 CFR Part 262, and in addition must contain the following information in the specified shaded items of the uniform manifest:

(a) Item D - The first transporter's telephone number must be provided in this space;
(b) Item F - If a second transporter is used, then the second transporter's telephone number must be provided in this space;
(c) Item H - The designated receiving facility's telephone number must be provided in this space;
(d) Item I, and R if the continuation sheet 8700-22A is used - The dangerous waste number (e.g., F001, D006, WT02, P102) must be provided in this space for each corresponding waste entered and described under Item 11, and 28 if the continuation sheet 8700-22A is used. As discussed in subsection (5) of this section, dangerous waste numbers WL01 or WL02 may be used in this space for labpacks;
(e) Item O, (on the continuation sheet 8700-22A) - If a third transporter is used, then the third transporter's telephone number must be provided in this space; and
(f) Item Q, (on the continuation sheet 8700-22A) - If a fourth transporter is used, then the fourth transporter's telephone number must be provided in this space.

WAC-173-303 Section 180(2)

(2) The manifest shall consist of enough copies to provide the generator, transporter(s), and facility owner/operator with a copy, and a copy for return to the generator.

WAC-173-303 Section 180(3)

(3) Manifest procedures.

(a) The generator shall:

(i) Sign and date the manifest certification by hand;
(ii) Obtain the handwritten signature of the initial transporter and date of acceptance on the manifest; and
(iii) Retain one copy in accordance with WAC 173-303-210, Generator recordkeeping.

(b) The generator shall give the remaining manifest copies to the transporter.

(c) If the transporter is unable to deliver the dangerous waste shipment to the designated facility or the alternate facility, the generator must either designate another facility or instruct the transporter to return the waste shipment.

(d) For shipments of dangerous waste within the United States solely by water (bulk shipments only), the generator must send three copies of the

16.0 WASTE MANAGEMENT

manifest dated and signed in accordance with this section to the owner or operator of the designated facility or the last water (bulk shipment) transporter to handle the waste in the United States if exported by water. Copies of the manifest are not required for each transporter.

(e) For rail shipments of dangerous waste within the United States which originate at the site of generation, the generator must send at least three copies of the manifest dated and signed in accordance with this section to: (i) The next nonrail transporter, if any; or

(ii) The designated facility if transported solely by rail; or
(iii) The last rail transporter to handle the waste in the United States if exported by rail.

(f) For shipments of federally regulated hazardous waste to a designated facility in an authorized state which has not yet obtained authorization to regulate that particular waste as hazardous, the generator must assure that the designated facility agrees to sign and return the manifest to the generator, and that any out-of-state transporter signs and forwards the manifest to the designated facility.

WAC-173-303 Section 180(5)

(5) Special instructions for shipment of labpacks. For purposes of completing the uniform dangerous waste manifest, dangerous waste numbers WL01 (for labpacks containing wastes designated as EHW) or WL02 (for labpacks containing wastes designated only as DW) may be used to complete Items I and R in lieu of the dangerous waste numbers that would otherwise be assigned to the contents of the labpack.

16.2.3 PCB Waste Labeling

40CFR 761 Part 40(a)(1)

Each of the following items in existence on or after July 1, 1978 shall be marked as illustrated in Figure 1 in 761.45(a): The mark illustrated in Figure 1 is referred to as ML throughout this subpart.
(1) PCB Containers;

40CFR 761 Part 40(a)(10)

Each storage area used to store PCBs and PCB Items for disposal.

40CFR 761 Part 40(a)(9)

PCB Article Containers containing articles or equipment that must be marked under paragraphs (a) (1) through (8) of this section;

40CFR 761 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).

40CFR 761 Part 40(e)

(e) As of October 1, 1979, applicable PCB Items in paragraph (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 61.45(a).

40CFR 761 Part 40(h)

(h) All marks required by this subpart must be placed in a position on the exterior of the PCB Items or transport vehicles so that the marks can be easily read by any persons inspecting or servicing the marked PCB Items or transport vehicles.

40CFR 761 Part 45

The following formats shall be used for marking:
(a) Large PCB Mark - ML. Mark ML shall be as shown in Figure 1, letters and striping on a white or yellow background and shall be sufficiently durable to equal or exceed the life (including storage for disposal) of the PCB Article, PCB Equipment, or PCB Container. The size of the mark shall be at least 15.25 cm (6 inches) on each side. If the PCB Article or PCB Equipment is too small to accommodate this size, the mark may be reduced in size proportionately down to a minimum of 5 cm (2 inches) on each side.
(b) Small PCB Mark - Ms. Mark Ms shall be as shown in Figure 2, letters and striping on a white or yellow background, and shall be

16.0 WASTE MANAGEMENT

sufficiently durable to equal or exceed the life (including storage for disposal) of the PCB Article, PCB Equipment, or PCB Container. The mark shall be a rectangle 2.5 by 5 cm (1 inch by 2 inches). If the PCB Article or PCB Equipment is too small to accommodate this size, the mark may be reduced in size proportionately down to a minimum of 1 by 2 cm (.4 by .8 inches).
[44 FR 31542, May 31, 1979. Redesignated at 47 FR 19527, May 6, 1982]

40CFR 761 Part 65(c)(3)

Any storage area subject to the requirements of paragraph (b) or paragraph (c)(1) of this section shall be marked as required in subpart C – 761.40(a)(10).

40CFR 761 Part 65(c)(8)

PCB Articles and PCB Containers shall be dated on the article or container when they are placed in storage. The storage shall be managed so that the PCB Articles and PCB Containers can be located by the date they entered storage. Storage containers provided in paragraph (c)(7) of this section, shall have a record that includes for each batch of PCBs the quantity of the batch and date the batch was added to the container. The record shall also include the date, quantity, and disposition of any batch of PCBs removed from the container.

16.4.4 Plans, Records & Reporting - Low-Level Radioactive Waste

DOE5820.2A 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.

DOE5820.2A Chapter III, Section 3.m(1)

Records and Reports

(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.

DOE5820.2A 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.

16.4.5 Plans, Records & Reporting - Mixed/Dangerous Waste

WAC-173-303 Section 210(2)

(2) The generator shall 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 shall keep a copy of his most recent notification (Form 2) until he is no longer defined as a generator under this chapter.

WAC-173-303 Section 210(3)

(3) Waste designation records.

(a) The generator shall 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,

16.0 WASTE MANAGEMENT

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.

WAC-173-303 Section 210(4)

(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.

WAC-173-303 Section 210(5)

(5) The periods of retention for any records described in this section shall be automatically extended during the course of any unresolved enforcement action requiring those records or upon request by the director.

WAC-173-303 Section 210(6)

(6) All generator records, including plans required by this chapter, shall be made available and furnished upon request by the director.

16.4.6 Plans, Records & Reporting - Land Disposal Restrictions

40CFR 268 Part 7(a)(7)

Generators must retain on-site a copy of all notices, certifications, demonstrations, waste analysis data, and other documentation produced pursuant to this section for at least five years from the date that the waste that is the subject of such documentation was last sent to on-site or off-site treatment, storage, or disposal. The five year record retention period is automatically extended during the course of any unresolved enforcement action regarding the regulated activity or as requested by the Administrator. The requirements of this paragraph apply to solid wastes even when the hazardous characteristic is removed prior to disposal, or when the waste is excluded from the definition of hazardous or solid waste under 40 CFR 261.2-261.6, or exempted from subtitle C regulation, subsequent to the point of generation.

16.6.1 Waste Acceptance Criteria - TRU Waste

DOE5820.2A 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.

DOE5820.2A Chapter II, Section 3.a(3)

Radioactive wastes with quantities of transuranic radionuclides in concentrations of 100 æCi/g or 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.

16.6.3 Waste Acceptance Criteria - Land Disposal Restrictions

40CFR 268 Part 40(a)

A restricted waste identified in 268.41 may be land disposed only if an extract of the waste or of the treatment residue of the waste developed using the test method in appendix I of this part does not exceed the value shown in Table CCWE of 268.41 for any hazardous constituent listed in Table CCWE for that waste, with the following exceptions: D004, D008, K031, K084, K101, K102, P010, P011, P012, P036, P038, and U136. Wastes D004, D008, K031, K084, K101, K102, P010, P011, P012, P036, P038, and U136 may be land disposed only if an extract of the waste developed using either the test method in Appendix I of this part or the test method in appendix II of part 261 does not exceed the values shown in Table CCW of 268.41 for any hazardous constituent listed in Table CWE for that waste.

40CFR 268 Part 40(b)

A restricted waste for which a treatment technology is specified under 268.42(a) may be land disposed after it is treated using that specified

16.0 WASTE MANAGEMENT

technology or an equivalent treatment method approved by the Administration under the procedures set forth in 268.42 (b).

40CFR 268 Part 40(c)

Except as otherwise specified in 268.43(c), a restricted waste identified in 268.43 may be land disposed only if the constituent concentrations in the waste or treatment residue of the waste do not exceed the value shown in Table CCW of 268.43 for any hazardous constituents listed in Table CCW for that waste.

42USC6924 (d)(2)

Paragraph (1) applies to the following hazardous wastes listed or identified under section 3001:

(A) Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing free cyanides at concentrations greater than or equal to 1,000 mg/l.

(B) Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing the following metals (or elements) or compounds of these metals (or elements) at concentrations greater than or equal to those specified below:

(i) arsenic and/or compounds (as As) 500 mg/l;

(ii) cadmium and/or compounds (as Cd) 100 mg/l;

(iii) chromium (VI and/or compounds (as Cr VI)) 500 mg/l;

(iv) lead and/or compounds (as Pb) 500 mg/l;

(v) mercury and/or compounds (as Hg) 20 mg/l;

(vi) nickel and/or compounds (as Ni) 134 mg/l;

(vii) selenium and/or compounds (as Se) 100 mg/l; and

(viii) thallium and/or compounds (as Th) 130 mg/l.

(C) Liquid hazardous waste having a pH less than or equal to two (2.0).

(D) Liquid hazardous wastes containing polychlorinated biphenyls at concentrations greater than or equal to 50 ppm.

(E) Hazardous wastes containing halogenated organic compounds in total concentration greater than or equal to 1,000 mg/kg.

When necessary to protect human health and the environment, the Administrator shall substitute more stringent concentration levels than the levels specified in subparagraphs (A) through (E).

WAC-173-303 Section 140(4)(c)

Disposal of solid waste. No person shall land dispose solid acid waste, except as provided in subsections (5), (6), or (7) of this section. A person is encouraged to reclaim, recycle, treat, detoxify, neutralize, or otherwise process these wastes to remove or reduce their harmful properties or characteristics, provided that such processing is performed in accordance with the requirements of this chapter.

WAC-173-303 Section 140(4)(d)

(d) Disposal of organic/carbonaceous waste.

(i) No person shall land dispose organic/carbonaceous waste, except as provided in subsections (5), (6), or (7) of this section. A person is encouraged to reclaim, recycle, recover, treat, detoxify, or otherwise process these wastes to remove or reduce their harmful properties or

characteristics, provided that such processing is performed in accordance with the requirements of this chapter. Organic/carbonaceous wastes must be incinerated as a minimum management method according to the dangerous waste management priorities as defined in subsection (1)(a) of this section.
(ii) This prohibition against the land disposal of organic/carbonaceous waste does not apply to black mud generated from the caustic leach recovery of cryolite at primary aluminum smelting plants.
(iii) This prohibition against the land disposal of organic/carbonaceous waste does not apply to any person who certifies to the department that recycling, treatment and incineration facilities are not available within a radius of one thousand miles from Washington state's borders. Such certification must be sent to the department by certified mail and must include: The name, address and telephone number of the person certifying; a brief description of the organic/carbonaceous waste covered by the certification; a discussion of the efforts undertaken to identify available recycling, treatment and incineration facilities; and the signature of the person responsible for the certification and development of information used to support the certification. Records and information supporting the certification must be retained by the certifying person and must be made available to the department upon request.

A certification that has been properly submitted to the department will remain valid until the department determines that a recycling, treatment or incineration facility is available within a radius of one thousand miles from Washington state's borders and the person who submitted the certification is unable to demonstrate otherwise. A recycling, treatment or incineration facility will be considered by the department to be available if such facility: Is operating, and; can safely and legally recycle, treat or incinerate the organic/carbonaceous waste, and; has sufficient capacity to receive and handle significant amounts of the waste, and; agrees to accept the waste.

16.6.4 Waste Acceptance Criteria - PCB Waste

40CFR 761 Part 79

(a) Any PCB Container to be decontaminated shall be decontaminated by flushing the internal surfaces of the container three times with a solvent containing less than 50 ppm PCB. The solubility of PCBs in the solvent must be five percent or more by weight. Each rinse shall use a volume of the normal diluent equal to approximately ten (10) percent of the PCB Container capacity. The solvent may be reused for decontamination until it contains 50 ppm PCB. The solvent shall then be disposed of as a PCB in accordance with 761.60(a). Non-liquid PCBs resulting from the decontamination procedures shall be disposed of in accordance with the provisions of 761.60(a)(4).

(b) Movable equipment used in storage areas shall be decontaminated by swabbing surfaces that have contacted PCBs with a solvent meeting the criteria of paragraph (a) of this section.

16.7 Waste Minimization

DOE5400.1 Chapter III, Section 4.b

A Waste Minimization Program that will contain goals for minimizing the volume and toxicity of all wastes that are generated, with annual reductions if programmatic requirements allow. Changes in waste quantity, volume and toxicity that are achieved shall be compared with quantities generated in the previous year. The proposed methods of treatment, storage, and disposal that accomplish waste minimization that are technically and economically practicable shall be reported as appropriate. Waste minimization plans required by specific legislation, such as RCRA, shall be included as a part of this program plan. This plan shall be completed no later than 18 months after the effective date of this Order. The plan shall be reviewed annually and updated every 3 years.

DOE5820.2A Chapter III, Section 3.c(1)

Waste Generation

(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 include consideration of process modification, process optimization, materials substitution and decontamination.

DOE5820.2A 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.

16.0 WASTE MANAGEMENT

DOE5820.2A 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.

16.8.5 Waste Treatment & Disposal Technology - Management of Containers

WAC-173-303 Section 160(2)

(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, whichever quantity is least, either less 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 one 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, 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 shall be ten percent or more of the container's or inner liner's capacity. 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 shall 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 shall 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 shall 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.

WAC-173-303 Section 160(3)

(3) 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.

WAC-173-303 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 metal shipping container (49 CFR Parts 178 and 179) of no more than 416-liter (110 gallon) capacity and surrounded by, at a minimum, a sufficient quantity of absorbent material to completely absorb all of the liquid contents of the inside containers. The metal outer container must be full after packing with inside containers and absorbent material;

(3) The absorbent 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 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.

WAC-173-303 Section 200(1)

(1) 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;

(b) The waste is placed in containers and the generator complies with WAC 173-303-630 (2), (3), (4), (5), (6), (8), (9), and (10), or 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 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). 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);

(c) The date upon which each period of accumulation begins is marked and clearly visible for inspection on each container;

(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 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

(e) The generator complies with the requirements for facility operators contained in:

WAC-173-303 Section 630(1)

(1) Applicability. The regulations in this section apply to owners and operators of all dangerous waste facilities that store containers of dangerous waste.

WAC-173-303 Section 630(2)

(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.

WAC-173-303 Section 630(3)

(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.

WAC-173-303 Section 630(4)

(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.

WAC-173-303 Section 630(5)

(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.

WAC-173-303 Section 630(6)

(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 shall 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.

WAC-173-303 Section 630(8)

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.

(b) The owner or operator shall 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 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 # 30, "Flammable and Combustible Liquids Code," shall be used. The owner/operator shall also comply with the requirements of WAC 173-303-395 (1)(d).

WAC-173-303 Section 630(9)

(9) 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.

(b) Dangerous waste must not be placed in an unwashed container that previously held an incompatible waste or material.

WAC-173-303 Section 630(10)

(10) Closure. At closure, all dangerous waste and dangerous waste residues must be removed from the containment system. Remaining

16.0 WASTE MANAGEMENT

containers, liners, bases, and soil containing or contaminated with dangerous waste or dangerous waste residues must be decontaminated or removed.

WAC-173-303 Section 630(7)(a)

Containment - 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 thenty-five year storm of twenty-four hous duration. The containment system must:
(i) Have a base underlying the containers which is free of cracks or gaps and is sufficiently impe;rvious to contain leaks, spills, and accumulated rainfall until the collected mataerial is detected and removed. The base must be sloped or the contianment system umust 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
(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 FO20, FO21, FO22, FO23, FO26, or FO27 need to be considered in this determination.

WAC-173-303 Section 630(7)(b)

Containment - Run-on into the containment system must be prevented, unless the department waives this requirement is the permit after determining that the collection system has sufficient excess capacity in addition to that required in (a)(iii) of this subsection to accomodate any run-on which might enter the system.

WAC-173-303 Section 630(7)(c)

Containment - 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 FO20, FO21, FO23, FO26, or FO27, 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 precitiation; or
(ii) The containers are elevated or are otherwise protected from contact with accumulated liquids.

WAC-173-303 Section 630(7)(d)

Containment - EHW in containers must be protected form the elements by means of a building or other protective covering that otherwise allows adequate inspection under subsection (6) of this section.

16.8.6 Waste Treatment & Disposal Technology - PCB Waste Storage

40CFR 761 Part 65(c)(1)

The following PCB Items may be stored temporarily in an area that does not comply with the requirements of paragraph (b) of this section for up to thirty days from the date of their removal from service, provided that a notation is attached to the PCB Item or a PCB Container (containing the item) indicating the date the item was removed from service:

(i) Non-leaking PCB Articles and PCB Equipment;

(ii) Leaking PCB Articles and PCB Equipment if the PCB Items are placed in a non-leaking PCB Container that contains sufficient sorbent materials to absorb any liquid PCBs remaining in the PCB Items; *

(iii) PCB Containers containing non-liquid PCBs such as contaminated soil, rags, and debris; and

(iv) PCB Containers containing liquid PCBs at a concentration between 50 and 500 ppm, provided a Spill Prevention, Control and Countermeasure Plan has been prepared for the temporary storage area in accordance with 40 CFR Part 112. In addition, each container must bear a notation that indicates that the liquids in the drum do not exceed 500 ppm PCB.

40CFR 761 Part 65(c)(4)

No item of movable equipment that is used for handling PCBs and PCB Items in the storage facilities and that comes in direct contact with PCBs shall be removed from the storage facility area unless it has been decontaminated as specified in 761.79.

16.0 WASTE MANAGEMENT

40CFR 761 Part 65(c)(5)

All PCB Articles and PCB Containers in storage shall be checked for leaks at least once every 30 days. Any leaking PCB Articles and PCB Containers and their contents shall be transferred immediately to properly marked non-leaking containers. Any spilled or leaked materials shall be immediately cleaned up, using sorbents or other adequate means, and the PCB-contaminated materials and residues shall be disposed of in accordance with 761.60(a)(4).

40CFR 761 Part 65(c)(6)

Except as provided in paragraph (c)(7) of this section, any container used for the storage of liquid PCBs shall comply with the Shipping Container Specification of the Department of Transportation (DOT), 49 CFR 178.80 (Specification 5 container without removable head), 178.82 (Specification 5B container without removable head), 178.102 (Specification 6D overpack with Specification 2S(178.35) or 2SL(178.35a) polyethylene containers) or 178.116 (Specification 17E container). Any container used for the storage of non-liquid PCBs shall comply with the specifications of 49 CFR 178.80 (Specification 5 container), 178.82 (Specification 5B container) or 178.115 (Specification 17C container). As an alternate, containers larger than those specified in DOT Specifications 5, 5B, or 17C may be used for non-liquid PCBs if the containers are designed and constructed in a manner that will provide as much protection against leaking and exposure to the environment as the DOT Specification containers, and are of the same relative strength and durability as the DOT Specification containers.

16.8.7 Waste Treatment & Disposal Technology - Asbestos Waste

40CFR 61 Part 150(a)(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

(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.

40CFR 61 Part 150(a)(4)

(4) Use an alternative emission control and waste treatment method that has received prior approval by the Administrator according to the procedure described in 61.149(c)(2).

40CFR 61 Part 150(a)(5)

As applied to demolition and renovation, the requirements of paragraph (a) of this section do not apply to Category I nonfriable ACM waste and Category II nonfriable ACM waste that did not become crumbled, pulverized, or reduced to powder.

94-FDB-015 Section A

DISPOSAL:

16.0 WASTE MANAGEMENT

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.

(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.

94-FDB-015 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.

WAC-296-65 Section 005

Asbestos worker training course content.

An approved asbestos work training course shall consist of at least thirty hours of training. This initial training course shall provide, at a minimum, information on the following topics:

(1) The physical characteristics of asbestos including types, fiber size, aerodynamic characteristics and physical appearance.

(2) Examples of different types of asbestos and asbestos-containing materials. Real asbestos shall be used only for observation by trainees and shall be enclosed in sealed unbreakable containers.

(3) The health hazards of asbestos including the nature of asbestos related diseases, routes of exposure, dose-response relationships, synergism between cigarette smoking and asbestos exposure, latency period of diseases, hazards to immediate family, and the health basis for asbestos standards.

(4) Employee personal protective equipment including the classes and characteristics of respirator types, limitations of respirators, proper selection, inspection, donning, use, maintenance and storage procedure, methods for field checking of the facepiece-to-face seal (positive and negative-pressure checks), qualitative and quantitative fit testing procedures, variability between field and laboratory protection factors, factors that alter respirator fit (e.g., eye glasses and facial hair), the components of a proper respiratory protection program, respirator program administrator, requirements on oil lubricated reciprocating piston compressors for breathing air, and selection and use of personal protective clothing. Qualitative or quantitative fit testing shall be performed on at least one student for demonstration purposes and in accordance with WAC 296-62-07715 and 296-62-07739.

(5) Use, storage and handling of launderable clothing, nonslip footwear, gloves, eye protection and hard hats.

(6) Medical monitoring procedures and requirements, including the provisions of WAC 296-62-071 through 296-62-07121 and 296-62-07725, any additional recommended procedures and tests, benefits of medical monitoring and employee access to records.

16.0 WASTE MANAGEMENT

(7) Air monitoring procedures and requirements specified in WAC 296-62-07709, including a description of equipment, sampling methods and strategies, reasons for air monitoring, types of samples, including area, personal and clearance samples, current standards with proposed changes if any, employee observation and notification, recordkeeping and employee access to records, interpretation of air monitoring results, and analytical methods for bulk and air samples.

(8) State-of-the-art work practices for asbestos removal and encapsulation activities including purpose, proper construction and maintenance of barriers and decontamination enclosure systems, posting of warning signs, electrical and ventilation system lock-out, proper working techniques and tools with vacuum attachments for minimizing fiber release, use of wet methods and surfactants, use of negative-pressure ventilation equipment for minimizing employee exposure to asbestos fibers and contamination prevention, scoring and breaking techniques for rigid asbestos products, glove bag techniques, use of HEPA vacuums and proper clean-up and disposal procedures. Work practice requirements for removal, encapsulation, enclosure, repair, and waste transportation shall be discussed individually. Appropriate work practices for both indoor and outdoor asbestos projects shall be included.

(9)Personal hygiene including entry and exit procedures for the work area, use of showers and prohibition of eating, drinking, smoking and chewing (gum or tobacco) in the work area.

(10) Additional safety hazards that may be encountered during asbestos removal and encapsulation activities and hazard abatement, including electrical hazards, scaffold and ladder hazards, slips, trips and falls, confined spaces, noise, and heat stress.

(11) The requirements, procedures and standards established by:

(a) The Environmental Protection Agency, 40 CFR Part 61, Subparts A and M.
(b) Washington state department of ecology.
(c) Local air pollution control agencies.
(d) Washington state department of labor and industries, division of industrial safety and health, chapter 49.17 RCW (Washington Industrial Safety and Health Act), chapter 49.26 RCW Health and safety--Asbestos), and ensuing regulations.

(12) Actual worksite considerations.

(13) The instruction required by this section shall include, at a minimum, hands-on training for the following;

(a) Glove bag techniques;
(b) The opportunity to don respirators including half facepiece and full facepiece air purifying respirators, powered air purifying respirators (PAPR), and Type-C supplied-air respirators;
(c) Removal of sprayed-on or troweled-on material, and pipe lagging;
(d) Basic construction of a decontamination unit, and proper entry and exit;
(e) Suit-up in protective clothing consisting of coveralls, foot coverings and head coverings.

(14) Asbestos-containing materials shall not be used for hands-on training.

(15) In recognition that asbestos abatement is an evolving industry, the department reserves the right to require additional subjects to be taught and to specify the amount of time which shall be allotted to adequately cover required subjects. To assure adequate coverage of required material, each sponsor shall be provided and required to incorporate into the training course, a detailed outline of subject matter developed by the department.

WAC-296-65 Section 007

Asbestos supervisor training course content.
An approved asbestos supervisor training course shall consist of at least thirty hours of training. This initial training course shall include lectures demonstrations, at least six hours of hands-on training, course review and a written examination. Audio-visual materials, where appropriate, are recommended to complement lectures. The training course shall provide, at a minimum, information on the following topics:

16.0 WASTE MANAGEMENT

(1) The physical characteristics of asbestos and asbestos-containing materials including identification of asbestos, aerodynamic characteristics, typical uses, physical appearance, hazard assessment considerations, and a summary of abatement control options.

(2) Health effects related to asbestos exposure including the nature of asbestos related diseases, routes of exposure, dose-response relationships and the lack of a safe level of exposure, synergism between asbestos exposure and cigarette smoking, latency period, hazards to the immediate family and the health basis for the standard.

(3) Employee personal protective equipment including the classes and characteristics of respirator types, limitations of respirators, proper selection, inspection, donning, use, maintenance, and storage procedures, methods for field checking of the facepiece-to face seal (positive and negative pressure checks), variability between field and laboratory protection factors, quantitative and qualitative fit test requirements, factors that alter respirator fit (facial hair, scars, etc.), the components of a proper respirator program, requirements for oil lubricated reciprocating compressors, maintenance of Type-C systems, standards for breathing air, selection and use of personal protective clothing, use, storage, and handling of nondisposable clothing, and regulations covering personal protective equipment.

(4) State-of-the-art work practices for asbestos removal and encapsulation activities including purpose, proper construction and maintenance of barriers and decontamination enclosure systems, posting of warning signs, electrical and ventilation system lock-out, proper working techniques and tools with vacuum attachments for minimizing fiber release, use of wet methods and surfactants, use of negative-pressure ventilation equipment for minimizing employee exposure to asbestos fibers and contamination prevention, scoring and breaking techniques for rigid asbestos products, glove bag techniques for rigid asbestos products, glove bag techniques, use of HEPA vacuums and proper clean-up and disposal procedures. Work practice requirements for removal, encapsulation, and repair shall be discussed separately, Appropriate work practices for both indoor and outdoor asbestos projects shall be included.

(5) Personal hygiene including entry and exit procedures for the work area, use of showers and prohibition of eating, drinking, smoking, and chewing (gum and tobacco) in the work area. Potential exposures, such as a family exposure shall also be included.

(6) Additional safety hazards that may be encountered during asbestos abatement activities and how to deal with them, including electrical hazards, heat stress, air contaminants other than asbestos, fire and explosion hazards, scaffold and ladder hazards, slips, trips, and falls, confined space entry requirements, and noise hazards.

(7) Medical monitoring procedures and requirements, including the provisions WAC 296-62-071 through 296-62-07121 and 296-62-07725, any additional recommended procedures and tests, benefits of medical monitoring and recordkeeping requirements.

(8) Air monitoring procedures and requirements specified in WAC 296-62-07709, including a description of equipment, sampling methods and strategies, reasons for air monitoring, types of samples, including area, personal and clearance samples, a description of aggressive sampling, current standards with proposed changes if any, employee observation and notification, recordkeeping, interpretation of air monitoring results, specifically from analyses performed by polarized light, phase contrast, and electron microscopy.

(9) The requirements, procedure, and standards established by;

(a) The Environmental Protection Agency, 40 CFR Part 61, Subparts A and M.
(b) The Washington state department of ecology.
(c) Local air pollution control agencies.
(d) Washington state department of labor and industries, division of industries division of industrial safety and health, chapter 49.17 RCW (Washington Industrial Safety and Health Act), Chapter 49.26 RCW (Health and safety--Asbestos), and ensuing regulations.

(10) Actual worksite considerations.

(11) Insurance and liability issues including contractor issues, industrial insurance coverage and exclusions, third party liabilities and defenses, private insurance coverage and exclusions, recordkeeping recommended for legal and insurance purposes.

(12) Supervisory techniques for asbestos abatement projects including supervisory practices to enforce and reinforce the required work practices

16.0 WASTE MANAGEMENT

and discourage unsafe work practices.

(13) Contract specifications including a discussion of the key elements to be included in contract specifications.

(14) Hands-on training for the following:

(a) Calibration of air-sampling equipment;
(b) Routine maintenance of air-purifying and air-supplied respirators;
(c) Setup of a decontamination unit including calculating the number of negative air machines needed as well as proper placement of the machines within the enclosure; and proper placement of the machines within the enclosure; and
(d) Quantitative and qualitative fit-testing protocols.

(15) In recognition that asbestos abatement is an evolving industry, the department reserves the right to require additional subjects to be taught and to specify the amount of time which shall be allotted to adequately cover required subjects. To assure adequate coverage of required material, each sponsor shall be provided and required to incorporate into their training course, a detailed outline of subject matter developed by the department.

WAC-296-65 Section 010

Asbestos worker certification.

(1) For the purposes of this section "individual" means any natural person.

(2) To qualify for an asbestos worker certificate, an individual must do the following:

(a) Successfully complete an approved asbestos worker training course;
(b) Achieve a score of at least seventy percent on a one hundred question multiple choice examination approved by the department but administered by the training course sponsor;
(c) Submit to the department a timely application validated by an approved training course sponsor. To be considered timely, an application must be received by the department not later than sixty days after the completion of the course. In the event that an application is not timely, the individual shall be required to pass, with a score of at least seventy percent, an examination administered by the department. A nonrefundable fifty dollar assessment shall be charged to take this examination; and
(d) Pay the fee prescribed in WAC 296-65-025.

(3) Individuals shall not perform any asbestos project work prior to issuance of the certificate.

(4) Certificates shall be issued and mailed to the individual applicants and shall be valid for one year from the date of issuance.

(5) Certified asbestos workers shall attend a seven-hour refresher course prior to certificate renewal.

(a) The course shall, at a minimum, adequately review the subjects required by WAC 296-65-005, update information on state-of-the-art procedures and equipment, and review regulatory changes and interpretations. Specific subjects may be required by the department.
(b) An application for renewal of the certificate must be validated by the refresher training course instructor.
(c) The refresher course must be taken prior to expiration of the certificate by may not be taken more than sixty days prior to expiration of the original or current certificate.
(d) The certificate renewal application must be received by the department no later than the expiration date of the current certificate. Applicants missing this renewal deadline shall be required to pass, with a score of seventy percent, an examination administered by the department. A nonrefundable fifty dollar fee will be charged to take this examination.
(e) Individuals who certificates have been expired for more than six months will be required to retake the entire thirty-hour basic course.

(6) The certificate shall be available for inspection at all times during an asbestos project.

16.0 WASTE MANAGEMENT

(7) The department may suspend or revoke a certificate as provided in WAC 296-65-050 and chapter 296-350 WAC.

WAC-296-65 Section 012

Asbestos supervisor certification.

(1) For the purpose of this section, "individual" means any natural person.

(2) To qualify for an asbestos supervisor certificate, an individual must meet the following criteria:

(a) Have at least 1600 hours of experience in one or more of the following disciplines:

(i) Asbestos abatement;
(ii) Asbestos project design;
(iii) Consultation on asbestos abatement projects;
(iv) Operations and maintenance program supervision;
(v) Construction project supervision;

(b)Possess a valid and current Washington state asbestos worker certificate;

(c) Successfully complete an approved asbestos supervisor training course;

(d) Achieve a score of at least seventy percent on a one hundred question multiple choice examination approved by the department but administered by the training course sponsor;

(e) Submit to the department a timely application validated by an approved training course sponsor. To be considered timely, an application must be received by the department not later than sixty days after the completion of the course. In the event that an applicant is not timely, the individual shall be required to pass, with a score of at least seventy percent, an examination administered by the department. A nonrefundable fifty dollar assessment shall be charged to take this examination; and

(f) Pay the fee prescribed in WAC 296-65-025.

(3) An individual shall not supervise any asbestos project prior to issuance of the certificate.

(4) Certificates shall be issued and mailed to the individual applicants and shall be valid for one year from the date of issuance.

(5) A certified asbestos supervisor shall attend a seven-hour supervisor refresher course prior to certificate renewal. It shall not be necessary to also take a worker refresher course.

(a) The course shall, at a minimum, adequately review the subjects required by WAC 296-65-007, update information on state-of-the-art procedures and equipment, and review regulatory changes and interpretations. Specific subjects may be required by the department.

(b) An application for renewal of the certificate must be validated by the refresher training course instructor.

(c) The refresher course must be taken prior to expiration of the certificate but may not be taken more than sixty days prior to expiration of the original or current certificate.

(d) The certificate renewal application must be received by the department no later than the expiration date of the current certificate. Applicants missing this renewal deadline shall be required to pass, with a score of seventy percent, an examination administered by the department. A nonrefundable fifty dollar fee will be charged to take this examination.

(e) Individuals whose certificates have been expired for more than six months will be required to retake the entire thirty-hour basic course.

16.0 WASTE MANAGEMENT

(6) The certificate shall be available for inspection at all times during an asbestos project.

(7) The department may suspend or revoke a certificate as provided in WAC 296-65-050 and chapter 296-350 WAC.

(8) Individuals who have completed the "competent person" training previously recognized by the department after January 1, 1987, need not comply with the requirements set forth in subsection (2) of this section and shall be issued asbestos supervisor certificated provided the following conditions are met;

(a) Be a certified asbestos worker as prescribed in WAC 296-65-010 for at least one year;

(b) Provide documentation of successful completion of a recognized "competent person" training course;

(c) Pass, with a score of at least seventy percent, an examination administered by the department. A nonrefundable fifty dollar assessment shall be charged to take this examination; and

(d) This subsection shall expire on June 30, 1990. Thereafter any individual who has completed "competent person" training shall obtain an asbestos supervisor certificate by complying with the requirements set forth in subsection (2) of this section.

WAC-296-65 Section 015

Training course approval.

(1) Basic and refresher asbestos training courses may be sponsored by any individual, person, or other entity having department approval. Approval shall be contingent on the sponsor's compliance, as applicable, with licensing requirements established by the state board of vocational education.

(2) Prior to receiving department approval, each course shall be evaluated by the department for the breadth of knowledge and experience required to properly train asbestos workers or supervisors. Course content shall be carefully scrutinized for adequacy and accuracy. Training techniques will be evaluated by the department.

(3) Sponsors of basic and refresher training courses proposed for approval must submit;

(a) Background information about course sponsors;
(b) Course locations and fees;
(c) Copies of course handouts;
(d) A detailed description of course content and the amount of time allotted to each major topic;
(e) A description of teaching methods to be utilized and a list of all audio-visual materials; the department may, in its discretion, request that copies of the materials be provided for review. Any audio-visual materials provided to the department will be returned to the applicant;
(f) A list of all personnel involved in course preparation and presentation and a description of the background, special training and qualifications of each. The department may, in its discretion, require proposed instructors to pass an examination on subjects related to their respective topics of instruction;
(g) A description of student evaluation methods and a copy of the required written examination including the scoring methodology to be used in grading the examination;
(h) A description of course evaluation methods; and
(i) Any restrictions of attendance (language, class size, affiliation, etc.).

(4) application for training course approval and course materials shall be submitted to the department at least sixty days prior to the requested approval date. Materials may be mailed to:
Asbestos Certification Program
Department of Labor and Industries, HC-412
805 Plum Street S.E.

16.0 WASTE MANAGEMENT

P.O. Box 207
Olympia, Washington 98504

(5) The decision to grant a renew approval of a basic or refresher asbestos training course shall be in the sole discretion of the department. Following approval of a basic or refresher asbestos training course, the department will issue the course sponsor an approval which is valid for one year from the date of issuance. Application for renewal must follow the procedures described in subsections (3) and (4) of this section. Following approval of a basic or refresher asbestos training course, in recognition that asbestos abatement is an evolving industry, the department reserves the right to require additional subjects to be taught and to specify the amount of time which shall be allotted to adequately cover required subjects. To assure adequate coverage of required material, each sponsor shall be provided and required to incorporate into their training course, a detailed outline of subject matter developed by the department.

(6) To be considered timely, the training course approval renewal must be received by the department no later than thirty days before the certificate expiration date.

(7) Any changes to a training course must be approved by the department in advance.

(8) The course sponsor shall provide the department with a list of all persons who have completed a basic or refresher training course. The list must be provided no later than ten days after a course is completed and must include the name and address of each trainee.

(9) The course sponsor must notify the department, in writing, at least fourteen days before a training course is scheduled to begin. The notification must include the date, time and address where the training will be conducted.

(10) A representative of the department may, at the department's discretion, attend a training course as an observer to verify that the training course is conducted in accordance with the program approved by the department.

(11) Course sponsors conducting training outside the state of Washington shall reimburse the department for reasonable travel expenses associated with department audits of the training courses. Reasonable travel expenses are defined as current state of Washington per diem and travel allowance rates including airfare and/or surface transportation rates. Such reimbursement shall be paid within thirty days of receipt of the billing notice.

(12) The training course sponsor shall limit each class to a maximum of thirty participants.

(13) The instructor to student ratio shall not exceed one-to-ten for any of the training required by WAC 296-65-005(13).

(14) The department may terminate the training course approval, if in the department's judgement the sponsor fails to maintain the course content and quality as initially approved, or fails to make changes to a course as required by WAC 296-65-015(5). Any "notice of termination of training course approval" issued by the department may act as an order of immediate restraint as described by RCW 49.17.130.

WAC-296-65 Section 020

Notification requirements.

(1) Before any person or individual begins an asbestos project involving more than forty-eight square feet or ten linear feet, unless the surface area of the pipe is greater than forty-eight square feet, of asbestos containing material, written notification shall be provided to the department. Notices shall include:

(a) Name and address of the owner and contractor.
(b) Description of the facility including size, age, and prior use of the facility.
(c) Amount of asbestos-containing material to be removed or encapsulated.
(d) Location of the facility.
(e) Exact starting and completion dates of the asbestos project, including shifts during which abatement work will be accomplished. These dates must correspond to the dates specified in the contract. Any change in these dates or work shifts shall be communicated to the department by an

amended notice.
(f) Nature of the project and methods used to remove or encapsulate the material.

(2) Failure to provide such notification will result in the loss of the exemption specified in WAC 296-65-030.

(3) Notices must be received by the department no later than ten days prior to the start of the project. Notices shall be sent directly to the department of labor and industries regional office having jurisdiction on the project.

(4) The director may waive the prenotification requirement upon written request of an owner for large-scale, on-going projects. In granting such a waiver, the director shall require the owner to provide prenotification if significant changes in personnel, methodologies, equipment, work site, or work procedures occur or are likely to occur. The director shall further require annual resubmittal of such notification.

(5) The director, upon review of an owner's reports, work practices, or other data available as a result of inspections, audits, or other authorized activities, may reduce the size threshold for prenotification required by this section. Such a change shall be based on the director's determination that significant problems in personnel, methodologies, equipment, work site, or work procedures are creating the potential for violations of this chapter.

(6) Emergency projects which disturb or release asbestos into the air shall be reported to the department within three working days after commencement of the project in the manner otherwise required under this chapter. The employees, the employees' collective bargaining representative or employee representative, if any, and other persons at the project area shall be notified of the emergency as soon as possible by the person undertaking the emergency project. A notice describing the nature of the emergency project shall be clearly posted adjacent to the work area.

(7) Incremental phasing in the conduct or design of asbestos projects or otherwise conducting or designing asbestos projects of a size less than the threshold exemption specified in subsection (1) of this section, with the intent of avoiding the notification requirements, is a violation of this chapter.

WAC-296-65 Section 030

Methods of compliance.

(1) Before submitting a bid or working on an asbestos abatement project, any person or individual shall obtain an asbestos contractor certificate as provided in WAC 296-65-017 and shall have in its employ at least one certified asbestos supervisor responsible for supervising all asbestos projects undertaken by the contractor.

(2) A certified asbestos supervisor will not be required on projects involving less than forty-eight square feet or ten linear feet of asbestos-containing material unless the surface area of the pipe is greater than forty-eight square feet.

(3) No employee or other individual is eligible to do work or supervise an asbestos project without being issued a certificate by the department except, in the case of an asbestos project undertaken by any partnership, firm, association, corporation, or sole proprietorship, and conducted in its own facility and by its own employees under the direct, on-site supervision of a certified asbestos supervisor. This exception does not apply to the state of Washington or its political subdivisions.

(4) No person may assign any employee, contract with, or permit any individual, to remove or encapsulate asbestos in any facility without the project being performed by a certified asbestos worker and under the direct, on-site supervision of a certified asbestos supervisor, except in the case of an asbestos project undertaken by any partnership, firm, association, corporation, or sole proprietorship, and conducted in its own facility and by its own employees under the direct, on-site supervision of a certified asbestos supervisor.

(5) Any partnership, firm association, corporation, or sole proprietorship that begins any construction, renovation, remodeling, maintenance, repair, or demolition project without meeting the requirements of WAC 296-65-07707 and the notification requirements as provided in subsection (6) of this section, shall lose the exemptions provided in subsections (3) and (4) of this section.

16.0 WASTE MANAGEMENT

(6) In cases excepted under subsections (3) and (4) of this section:

(a) Direct, on-site supervision by a certified asbestos supervisor shall be required for asbestos projects performed at one project location by workers who are not certified.
(b) If a project is conducted using only certified workers, or if a certified worker functions as a foreman or lead person, supervision can be performed in the regular course of a supervisor's duties and need not be direct and on-site.
(c) The partnership, firm, association, corporation, or sole proprietorship shall annually submit, to the department, a written description which includes at least the following information:

(i) The kinds of asbestos projects expected to be undertaken during a period of time not to exceed one year from the date of submission;
(ii) The procedures to be used in undertaking the asbestos projects;
(iii) Methods of compliance with applicable department regulations;
(iv) Methods of compliance with any additional procedures required by law for the safe demolition, removal encapsulation, salvage, and disposal of asbestos;
(v) A copy of the written inspection report or statement as required by WAC 296-65-07707; and
(vi) The name, address and certification number of the supervising certified asbestos supervisor.

(7) The written descriptions required in this section shall be submitted to the department prior to commencing any project described.

(8) A further written description must be submitted to the department prior to commencing a project, if previously unidentified or new asbestos projects are proposed during the one year period covered by the written description submitted to the department in accordance with subsection (6) of this section.

(9) Written descriptions, shall be mailed to:
Asbestos Certification Program,
Department of Labor and Industries, HC-412
805 Plum Street S.E.
P.O. Box 207
Olympia, Washington 98504

(10) In addition to losing the exemption in subsection (5) of this section, any partnership, firm, association, corporation, or sole proprietorship who fails to comply with subsections (6) through (9) of this section shall be subject to a mandatory fine of not less than two hundred fifty dollars for each violation. Each day the violation continues shall be considered a separate violation. In addition, any construction, renovation, remodeling, maintenance, repair, or demolition which was started without meeting the requirements of this section shall be halted immediately and cannot be resumed before meeting such requirements.

16.8.8 Waste Treatment & Disposal Technology - Used Oil

40CFR 279 Part 10(b)(1)

(b) Mixtures of used oil and hazardous waste--
(1) Listed hazardous waste.
(i) Mixtures of used oil and hazardous waste that is listed in subpart D of part 261 of this chapter are subject to regulation as hazardous waste under parts 260 through 266, 268, 270, and 124 of this chapter, rather than as used oil under this part.
(ii) Rebuttable presumption for used oil. Used oil containing more than 1,000 ppm total halogens is presumed to be a hazardous waste because it has been mixed with halogenated hazardous waste listed in subpart D of part 261 of this chapter. Persons may rebut this presumption by demonstrating that the used oil does not contain hazardous waste (for example, by using an analytical method from SW-846, Edition III, to show that the used oil does not contain significant concentrations of halogenated hazardous constituents listed in appendix VIII of part 261 of this chapter). EPA Publication SW-846, Third Edition, is available from the Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954, (202) 783-3238 (document number 955-001-00000-1). [279.10(b)(1)(ii) amended at 59 FR 10559, March 4, 1994]
(A) The rebuttable presumption does not apply to metalworking oils/fluids containing chlorinated paraffins, if they are processed, through a

16.0 WASTE MANAGEMENT

tolling arrangement as described in 279.24(c), to reclaim metalworking oils/fluids. The presumption does apply to metalworking oils/fluids if such oils/fluids are recycled in any other manner, or disposed.
(B) The rebuttable presumption does not apply to used oils contaminated with chlorofluorocarbons (CFCs) removed from refrigeration units where the CFCs are destined for reclamation. The rebuttable presumption does apply to used oils contaminated with CFCs that have been mixed with used oil from sources other than refrigeration units.

40CFR 279 Part 10(b)(2)

Characteristic hazardous waste. Mixtures of used oil and hazardous waste that solely exhibits one or more of the hazardous waste characteristic identified in subpart C of part 261 of this chapter and mixtures of used oil and hazardous waste that is listed in subpart D solely because it exhibits one or more of the characteristics of hazardous waste identified in subpart C are subject to:

(i) Except as provided in paragraph (b)(2)(iii) of this section, regulation as hazardous waste under parts 260 through 266, 268, 270, and 124 of this chapter rather than as used oil under this part, if the resultant mixture exhibits any characteristics of hazardous waste identified in subpart C of part 261 of this chapter; or
(ii) Except as specified in 279.10(b)(2)(iii) regulation as used oil under this part, if the resultant mixture does not exhibit any characteristics of hazardous waste identified under subpart C of part 261 of this chapter.
(iii) Regulation as used oil under this part, if the mixture is of used oil and a waste which is hazardous solely because it exhibits the characteristic of ignitability (e.g., ignitable-only mineral spirits), provided that the resultant mixture does not exhibit the characteristic of ignitability under 261.21 of this chapter.

40CFR 279 Part 21

Hazardous waste mixing.
(a) Mixtures of used oil and hazardous waste must be managed in accordance with 279.10(b).

(b) The rebuttable presumption for used oil of 279.10(b)(1)(ii) applies to used oil managed by generators. Under the rebuttable presumption for used oil of 279.10(b)(1)(ii), used oil containing greater than 1,000 ppm total halogens is presumed to be a hazardous waste and thus must be managed as hazardous waste and not as used oil unless the presumption is rebutted. However, the rebuttable presumption does not apply to certain metalworking oils/fluids and certain used oils removed from refrigeration units.

40CFR 279 Part 22

279.22 Used oil storage.
Used oil generators are subject to all applicable Spill Prevention, Control and Countermeasures (40 CFR part 112) in addition to the requirements of this Subpart. Used oil generators are also subject to the Underground Storage Tank (40 CFR part 280) standards for used oil stored in underground tanks whether or not the used oil exhibits any characteristics of hazardous waste, in addition to the requirements of this subpart. [279.22 amended at 58 FR 26425, May 3, 1993]
(a) Storage units. Used oil generators shall not store used oil in units other than tanks, containers, or units subject to regulation under parts 264 or 265 of this chapter.
(b) Condition of units. Containers and aboveground tanks used to store used oil at generator facilities must be:
(1) In good condition (no severe rusting, apparent structural defects or deterioration); and
(2) Not leaking (no visible leaks).
(c) Labels.
(1) Containers and aboveground tanks used to store used oil at generator facilities must be labeled or marked clearly with the words "Used Oil."
(2) Fill pipes used to transfer used oil into underground storage tanks at generator facilities must be labeled or marked clearly with the words "Used Oil."
(d) Response to releases. Upon detection of a release of used oil to the environment not subject to the requirements of part 280, subpart F of this chapter which has occurred after the effective date of the authorized used oil program for the State in which the release is located, a generator must perform the following cleanup steps:
(1) Stop the release;
(2) Contain the released used oil;
(3) Clean up and manage properly the released used oil and other materials; and
(4) If necessary to prevent future releases, repair or replace any leaking used oil storage containers or tanks prior to returning them to service.

16.0 WASTE MANAGEMENT

40CFR 279 Part 81

279.81 Disposal.
(a) Disposal of hazardous used oils. Used oils that are identified as a hazardous waste and cannot be recycled in accordance with this part must be managed in accordance with the hazardous waste management requirements of parts 260 through 266, 268, 270 and 124 of this chapter.
(b) Disposal of nonhazardous used oils. Used oils that are not hazardous wastes and cannot be recycled under this part must be disposed in accordance with the requirements of parts 257 and 258 of this chapter.

WAC-173-303 Section 515(1)

Applicability.

(a) This section applies to used oil that is burned for energy recovery in any boiler or industrial furnace that is not regulated under Subpart O of 40 CFR Part 265 or WAC 173-303-670, if such used oil:

(i) Exhibits any characteristic of a dangerous waste identified in WAC 173-303-090; or

(ii) Is designated as DW solely through WAC 173-303-100; or

(iii) Is designated solely as W001.

(b)

(i) This section does not apply to used oil burned for energy recovery that is mixed with a listed waste (except as provided in (a)(iii) of this subsection) or that is designated as EHW through WAC 173-303-100. Such used oil is subject to the requirements of WAC 173-303-510.

(ii) Used oil containing more than 1000 ppm of total halogens is presumed to be a dangerous waste because it has been mixed with halogenated dangerous waste listed in WAC 173-303-9903 or 173-303-9904. Such dangerous wastes are subject to the requirements of WAC 173-303-510. Persons may rebut this presumption by demonstrating that the used oil does not contain dangerous waste (for example, by showing that the used oil does not contain significant concentrations of halogenated dangerous constituents listed in WAC 173-303-9905).

(iii) This section does not apply to used oil that is designated for any reason other than being listed as W001 if such used oil is burned for energy recovery by the generator of the used oil in his own marine or diesel engines.

(c) If a used oil subject to this section does not exceed any of the specifications of Table 1, it is subject only to the analysis and recordkeeping requirements under subsection (4)(b)(i) and (vi) of this section; otherwise, it is subject to all applicable provisions of this section.

(d) For the purposes of this chapter:

(i) "Used oil" means any oil that has been refined from crude oil, used, and, as a result of such use, is contaminated by physical or chemical impurities;

(ii) Used oil fuel includes any fuel produced from used oil by processing, blending, or other treatments;

(iii) Used oil fuel that exceeds any specification level (described in Table 1) is termed "off-specification used oil fuel."

TABLE 1
USED OIL EXCEEDING ANY SPECIFICATION LEVEL IS SUBJECT TO THIS SECTION
WHEN BURNED FOR ENERGY RECOVERY

Constituent/property	Allowable level
Arsenic	5 ppm maximum

16.0 WASTE MANAGEMENT

Cadmium	2 ppm maximum
Chromium	10 ppm maximum
Lead	100 ppm maximum
Flash point	100ø F minimum
Total halogens	4,000 ppm maximum*
Polychlorinated Biphenyls	2 ppm maximum

* Used oil containing more than 1,000 ppm total halogens is presumed to be a dangerous waste under the rebuttable presumption provided under (b)(ii) of this subsection. Such used oil is subject to WAC 173-303-510 rather than this section when burned for energy recovery unless the presumption of mixing can be successfully rebutted.

18.0 NUCLEAR SAFETY

18.0 NUCLEAR SAFETY

18.1.2 Self-Assessment Process

10CFR 830 Part 120(c)(3)(i)

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

DOE5482.1B 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.

DOE5482.1B Section 9.d(2) (a) thru (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.

DOE5482.1B Section 9.d.(2)(g)

Provide for objective and independent review of ES&H functions to determine that they are conducting reviews of:

1 Proposed modifications to plant and equipment having safety significance.
2 Proposed experiments and results thereof having safety significance.
3 Procedures and significant changes thereto: administrative, operating (normal and abnormal), maintenance, quality assurance (as it applies to the policy and objectives stated in paragraph 7), and emergency.
4 Organization and staffing of each facility.
5 Operating limits, changes thereto, and violations thereof.
6 Operator and supervisor training programs, certification, and recertification standards and procedures.
7 Accidents, incidents, and unusual occurrences.

18.3.1 Safety Analysis Report

DOE5480.23 Section 8

Requirements - 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 non-facility 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 non-facility 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 1 provides guidance in greater detail than the requirements of this Order.

DOE5480.23 Section 8.a

Graded Approach for the Level of Analysis

18.0 NUCLEAR SAFETY

(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

DOE5480.23 Section 8.b

Scope and Content of Safety Analysis Reports.

(1) SARs shall define the safety basis, document the logic of its derivation, demonstrate adherence to the safety basis, and justify its adequacy.

(2) Each SAR required by this Order shall include thorough documentation of

DOE5480.23 Section 8.b(3)

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; considerations 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 sabatage and other malevolent acts since thses actions are covered under security protection of the facility.

(l) Management, organization, and institutional safety provisions;

(m) Procedures and training;

(n) Human factors;

18.0 NUCLEAR SAFETY

(o) Initial testing, inservice surveillance, and maintenance;

(p) Derivation of TSRs;

(q) Operational safety;

(r) Quality assurance;

(s) Emergency preparedness;

(t) Provisions for decontamination and decommissioning; and

(u) Applicable Facility design codes and standards

DOE5480.23 Section 8.d

Document Control. Contractors with the primary responsibility for the design, construction, operation, or decommissioning of DOE nuclear facilities must maintain such document control as may be necessary to ensure that all users of SARs and their supporting documentation designated by DOE or the contractor as authorized users, including DOE line management and the Department's safety oversight groups, have current editions.

DOE5480.23 Section 9.b(1)

Preparation and Submittal of Upgraded Safety Analysis Reports for Existing Nuclear Facilities.
(1) Contractors responsible for the operation of DOE-owned nuclear facilities that are scheduled to submit a Safety Analysis Report within 12 months after the date of issuance of this Order, shall implement a program to upgrade, as necessary, the safety analyses to reflect the requirements of this Order. 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. Upgraded SARs shall be submitted to the PSO for approval in accordance with the plan and schedule required by paragraph 9(b)(2) of this Order.

DOE5480.23 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 150 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.

DOE5480.23 Section 9.c

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. The DOE approval of any Unreviewed Safety Question pursuant to DOE 5480.21, amendments to the TSRs, and the material submitted by the contractor to the PSO in support of these approvals shall be considered an addendum to the SAR until the information is incorporated into the SAR as part of the next annual update.

DOE5480.24 Section 7.c

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.

18.0 NUCLEAR SAFETY

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. Values presented in the standards to ensure criticality safety should be used cautiously and should include all adjustments, conditions, and ranges of applicability called for by the mandatory standards in paragraph 7a of this Order.

The Criticality Safety section of the SAR shall include (or be included by referring to other sections of the SAR) but not be limited to the following:

(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.

(2) A statement of the chemical and physical form of fissionable material in each step of the process, including isotopic the nature of any material, and the resulting concentrations, densities, and degrees of moderation throughout the steps of the process.

(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.

(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.

(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.

(6) A description of the safety control parameters which are intended to prevent criticality resulting from events such as: accumulation of fissionable material in scrap or waste, lathe turnings, crucible slag, pickling solutions, choppings, sumps, filters, etc. Also included shall be the description of the technical practices used to prevent exceeding the safety control parameters.

(7) 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.

(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.

(9) An analysis of the spacing of masses of fissionable material within each process area and separation from fissionable material in adjoining areas.

DOE6430.1A Section 0110-5.2[3]

The Final Safety Analysis Report (FSAR) shall be developed during the construction phase of the project and shall be completed and approved prior to the initiation of facility operations. The FSAR shall be updated as appropriate to reflect changes affecting safety that are made to the facility during its lifetime.

DOE6430.1A Section 0110-5.2[4]

Areas to be addressed in the safety analysis include, but are not necessarily limited to, the following:

Form, type, and amount of hazardous materials (nuclear or other) to be stored, handled, or processed

Principal hazards and risks that can be encountered in facility operation, including potential accidents and predicted consequences of fire, explosion, radiation, toxic exposure, structural failure, wind, flood, earthquake, tornado, operating error, failure of essential operating

18.0 NUCLEAR SAFETY

equipment, and failure of safety systems

Selected design basis accidents such as DBF, DBW, DBE, DBT, DBA, and DBFL. These shall be postulated and quantified, including the rationale for selection

18.3.2 Hazard Classification

DOE5480.23 Section 8.c(1)

Hazard Classification for Nuclear Facilities and Operations. Contractors shall be required to perform a hazard analysis of their nuclear activities and classify their processes, operations, or activities in accordance with the following requirements:

Classification Categories. The consequences of unmitigated releases of radioactive and/or hazardous material shall be evaluated and classified by the following hazard categories:

(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.

DOE5480.23 Section 8.c(2)

Inventory of Hazardous Materials. The hazard analysis shall be based on an inventory enveloping all radioactive and non-radioactive hazardous materials that are stored, utilized, or may be formed within a nuclear facility.

DOE5480.23 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 onsite and offsite.

DOE5480.23 Section 8.c(4)

Submission of Hazard Analysis to DOE. The hazard analysis shall be submitted to DOE for approval in accordance with the safety analysis plan and schedule required by paragraph 9(b)(2) of this Order.

18.4.1 Procedures To Implement the TSR Process

DOE5480.22 Section 9.a

TECHNICAL SAFETY REQUIREMENTS.

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;

DOE5480.22 Section 9.c

TECHNICAL SAFETY REQUIREMENTS.

The TSR and its appendices constitute an agreement or contract between DOE and the facility operating management regarding the safe operation

18.0 NUCLEAR SAFETY

of the facility. As such, they cannot be changed without PSO approval.

DOE5480.22 Section 9.f

TECHNICAL SAFETY REQUIREMENTS.

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.

DOE5480.22 Section 9.g

TECHNICAL SAFETY REQUIREMENTS.

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.

DOE5480.22 Section 9.h

TECHNICAL SAFETY REQUIREMENTS.

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.

DOE5480.22 Section 9.i

TECHNICAL SAFETY REQUIREMENTS.

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.

18.4.2 TSR Document

DOE5480.22 Section 9.b

TECHNICAL SAFETY REQUIREMENTS.

Technical Safety Requirements shall define the operating limits and surveillance requirements, the basis thereof, safety boundaries, and management or administrative controls necessary to protect the health and safety of the public and to minimize the potential risk to workers from the uncontrolled release of radioactive or other hazardous materials and from radiation exposure due to inadvertent criticality. Technical Safety Requirements shall be based on the facility Safety Analysis Report and shall set forth specific limits and other requirements as specified in this Order and Attachment 1 to this Order, "Guidelines for Technical Safety Requirements." Attachment 1 presents an approach for the implementation and preparation of Technical Safety Requirements documents which is acceptable to DOE. Other approaches that are compatible with Attachment 1 may be utilized providing that they are justified and approved in writing by the PSO.

DOE5480.22 Section 9.e

TECHNICAL SAFETY REQUIREMENTS.

Technical Safety Requirements shall consist of the following:

(1) Use and Application. Definitions of terms, operating modes, frequency notations, and actions to be taken in the event of violation of Technical Safety Requirements operating limits or surveillance requirements are to be included in the Use and Application section. This section

18.0 NUCLEAR SAFETY

of the Technical Safety Requirements shall contain the basic instructions for using and applying the safety restriction contained in the Technical Safety Requirements.

(2) Safety Limits (SL). Safety Limits are limits on process variables associated with those physical barriers, generally passive, that are necessary for the intended facility function and which are found to be required to guard against the uncontrolled release of radioactivity and other hazardous materials (this includes releases into the complex and/or the community). If any Safety Limit is exceeded at any reactor or nonreactor nuclear facility, action shall begin immediately to place the facility in the most stable, safe condition attainable including total shutdown of either reactor or nonreactor nuclear facilities. The appropriate time frame for the completion of the action for each nuclear facility has to be developed and justified by the contractor, as appropriate, in the TSR document which requires PSO approval. The SLs shall describe the action to be taken when an SL is exceeded. If a SL is exceeded, the contractor shall notify DOE in accordance with DOE 5000.3A, review the matter, and record the results of the

18.5 Unreviewed Safety Questions

DOE5480.21 Section 10.b

PROGRAM REQUIREMENTS.

A safety evaluation shall be performed for:

(1) Temporary or permanent changes in the facility as described in the existing safety analyses;

(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.

DOE5480.21 Section 10.c

PROGRAM REQUIREMENTS.

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.

18.5.1 Unreviewed Safety Question Process

DOE5480.21 Chapter III, Section 5.a

Implementing Procedures.

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.

DOE5480.21 Section 10.e

PROGRAM REQUIREMENTS.

18.0 NUCLEAR SAFETY

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 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.

18.5.2 Unreviewed Safety Question Notification

DOE5480.21 Section 10.a

PROGRAM REQUIREMENTS.

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.

DOE5480.21 Section 10.d

PROGRAM REQUIREMENTS.

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).

18.6 Nuclear Criticality Safety

ANSI/ANS-8.19-84 Section 4.1

Management shall accept overall responsibility for safety of operations. Continuing interest in safety should be evident.

ANSI/ANS-8.19-84 Section 4.2

Management shall formulate nuclear criticality safety policy and make it known to all employees involved in operations with fissile material.

18.0 NUCLEAR SAFETY

ANSI/ANS-8.19-84 Section 4.3

Management shall assign responsibility and delegate commensurate authority to implement established policy. Responsibility for nuclear criticality safety should be assigned in a manner compatible with that for other safety disciplines.

ANSI/ANS-8.19-84 Section 4.4

Management shall provide personnel familiar with the physics of nuclear criticality and with associated safety practices to furnish technical guidance appropriate to the scope of operations. This function should, to the extent practicable, be administratively independent of operations.

ANSI/ANS-8.19-84 Section 4.5

Management shall establish a means for monitoring the nuclear criticality safety program.

ANSI/ANS-8.19-84 Section 4.6

Management shall periodically participate in auditing the overall effectiveness of the nuclear criticality safety program.

ANSI/ANS-8.19-84 Section 5.1

Each supervisor shall accept responsibility for the safety of operations under his control.

ANSI/ANS-8.19-84 Section 5.2

Each supervisor shall be knowledgeable in those aspects of nuclear criticality safety relevant to operations under his control. Training and assistance should be obtained from the nuclear criticality safety staff.

ANSI/ANS-8.19-84 Section 5.3

Each supervisor shall provide training and shall require that the personnel under his supervision have an understanding of procedures and safety considerations such that they may be expected to perform their functions without undue risk. Records of training activities and verification of personnel understanding shall be maintained.

ANSI/ANS-8.19-84 Section 5.4

Supervisors shall develop or participate in the development of written procedures applicable to the operations under their control. Maintenance of these procedures to reflect changes in operations shall be a continuing supervisory responsibility.

ANSI/ANS-8.19-84 Section 5.5

Supervisors shall verify compliance with nuclear criticality safety specifications for new or modified equipment before its use.

ANSI/ANS-8.19-84 Section 5.6

Each supervisor shall require conformance with good safety practices including unambiguous identification of fissile materials and good housekeeping.

ANSI/ANS-8.19-84 Section 6.1

The nuclear criticality safety staff shall provide technical guidance for the design of equipment and processes and for the development of operating procedures.

ANSI/ANS-8.19-84 Section 6.2

The staff shall maintain familiarity with current developments in nuclear criticality safety standards, guides, and codes. Knowledge of current nuclear criticality information should be maintained.

ANSI/ANS-8.19-84 Section 6.3

The staff should consult with knowledgeable individuals to obtain technical assistance as needed.

ANSI/ANS-8.19-84 Section 6.4

The staff shall maintain familiarity with all operations within the organization requiring nuclear criticality safety controls.

ANSI/ANS-8.19-84 Section 6.5

The staff shall assist supervision, on request, in training personnel.

18.0 NUCLEAR SAFETY

ANSI/ANS-8.19-84 Section 6.6

The staff shall conduct or participate in audits of criticality safety practices and compliance with procedures as directed by management.

ANSI/ANS-8.19-84 Section 6.7

The staff shall examine reports of procedural violations and other deficiencies for possible improvement of safety practices and procedural requirements, and shall report their findings to management.

ANSI/ANS-8.19-84 Section 7.1

The purpose of operating procedures is to facilitate the safe and efficient conduct of the operation. Procedures should be organized and presented for convenient use by operators. They should be free of extraneous material.

ANSI/ANS-8.19-84 Section 7.2

Procedures shall include those controls and limits significant to the nuclear criticality safety of the operation.

ANSI/ANS-8.19-84 Section 7.3

Supplementing and revising procedures as improvements become desirable shall be facilitated.

ANSI/ANS-8.19-84 Section 7.4

Active procedures shall be reviewed periodically by supervision.

ANSI/ANS-8.19-84 Section 7.5

New or revised procedures impacting nuclear criticality safety shall be reviewed by the nuclear criticality safety staff.

ANSI/ANS-8.19-84 Section 7.6

Procedures should be supplemented by posted nuclear criticality safety limits or limits incorporated in operating check lists or flow sheets.

ANSI/ANS-8.19-84 Section 7.7

Deviations from operating procedures and unforeseen alterations in process conditions that affect nuclear criticality safety shall be documented, reported to management, and investigated promptly. Action shall be taken to prevent a recurrence.

ANSI/ANS-8.19-84 Section 7.8

Operations shall be reviewed frequently (at least annually) to ascertain that procedures are being followed and that process conditions have not been altered so as to affect the nuclear criticality safety evaluation.

ANSI/ANS-8.19-84 Section 8.1

Before starting a new operation with fissile materials or before an existing operation is changed, it shall be determined that the entire process will be subcritical under both normal credible abnormal conditions.

ANSI/ANS-8.19-84 Section 8.2

The nuclear criticality safety evaluation shall determine and explicitly identify the controlled parameters and their associated limits upon which nuclear criticality safety depends.

ANSI/ANS-8.19-84 Section 8.3

The nuclear criticality safety evaluation shall be documented with sufficient detail, clarity, and lack of ambiguity to allow independent judgment of results.

ANSI/ANS-8.19-84 Section 8.4

Before starting operation, there shall be an independent assessment that confirms the adequacy of the nuclear criticality safety evaluation.

DOE5480.24 Section 7.a(1)

REQUIREMENTS. The contractor criticality safety program for nuclear facilities shall include the following requirements:

The basic elements and control parameters of programs for nuclear criticality safety shall satisfy the requirements of the following mandatory

18.0 NUCLEAR SAFETY

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-8.19, "Administrative Practices for Nuclear Criticality Safety."

ANS-8.7, "Guide for Nuclear Criticality Safety in the Storage of Fissile Materials."

Contractors shall be required to comply with the requirements ("shall" statements) and the recommendations ("should" statements) of the mandatory ANS nuclear criticality safety standards except as modified below. When the cognizant PSO approves the technical basis for nonadherence of a recommendation in the ANS standards, the recommendation shall not become a requirement of this Order. Conversely, when the cognizant PSO does not approve nonadherence of a recommendation of the ANS standards, that recommendation shall become a requirement under this Order.

18.6.1 Criticality Safety Design Practices

ANS8.7/ANSIN16.5 Section 4.1.1

All operations with fissile material, including storage, shall be conducted in accordance with American National Standard for Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors

ANS8.7/ANSIN16.5 Section 4.1.2

Methods of storage control and operational practices approved by management shall be described in written procedures. Persons participating in the transfer and storage of material shall be familiar with these procedures. Limits for storage shall be posted.

ANS8.7/ANSIN16.5 Section 4.1.3

Management shall provide for inspections to verify compliance with established procedures.

ANS8.7/ANSIN16.5 Section 4.1.4

Access to storage areas shall be controlled.

ANS8.7/ANSIN16.5 Section 4.2.1

Technical Practices. Limits for the storage of fissile material shall be based on experimental data or the results of validated computational techniques.

ANS8.7/ANSIN16.5 Section 4.2.10

Good housekeeping shall be incorporated as an important part of nuclear criticality safety practices.

ANS8.7/ANSIN16.5 Section 4.2.2

Storage facilities and structures shall be designed fabricated, and maintained in accordance with good engineering practices.

ANS8.7/ANSIN16.5 Section 4.2.4

The design of storage structures should tend to preclude unacceptable arrangements or configurations, thereby reducing reliance on administrative controls.

ANS8.7/ANSIN16.5 Section 4.2.5

Spacing of material may be maintained by the use of birdcage fixtures, covered metal cans or physical barriers on shelves. Shelving shall be sturdy and noncombustible.

ANSI/ANS-8.1 Section 4.1.1

Responsibilities.

Management shall clearly establish responsibilities for nuclear criticality safety. Supervision should be made as responsible for nuclear criticality

18.0 NUCLEAR SAFETY

safety as for production, development, research, or other functions. Each individual, regardless of position, shall be made aware that nuclear criticality safety in his work area is ultimately his responsibility. This may be accomplished through training and periodic retraining of all operating and maintenance personnel. Nuclear criticality safety differs in no intrinsic way from industrial safety, and good managerial practice apply to both.

Management shall provide personnel skilled in the interpretation of data pertinent to nuclear criticality safety and familiar with operations to serve as advisors to supervision. These specialists should be, to the extent practicable, administratively independent of process supervision.

Management shall establish the criteria to be satisfied by nuclear criticality safety controls. Distinction may be made between shielded and unshielded facilities and the criteria may be less stringent when adequate shielding and confinement assure the protection of personnel.

ANSI/ANS-8.1 Section 4.1.1.1

Management shall clearly establish responsibility for nuclear criticality safety. Each individual, regardless of position, shall be made aware that nuclear criticality safety in his work area is ultimately his

ANSI/ANS-8.1 Section 4.1.1.2

Management shall provide personnel skilled in the interpretation of data pertinent to nuclear criticality safety and familiar with operations to serve as advisors to supervision. These specialists should be, to the extent practicable, administratively independent of process supervision.

ANSI/ANS-8.1 Section 4.1.2

Before a new operation with fissionable materials is begun or before an existing operation is changed, it shall be determined that the entire process will be subcritical under both normal and credible abnormal conditions. Care shall be exercised to determine those conditions which result in the maximum effective multiplication factor (k < sub > (emf)).

ANSI/ANS-8.1 Section 4.1.3

Operations to which nuclear criticality safety is pertinent shall be governed by written procedures. All persons participating in these operations shall understand and be familiar with the procedures. The procedures shall specify all parameters they are intended to control. They should be such that no single, inadvertent departure from a procedure can cause a criticality accident.

ANSI/ANS-8.1 Section 4.1.4

The movement of fissionable materials shall be controlled. Appropriate materials labeling and area posting shall be maintained specifying material identification and all limits on parameters that are subjected to procedural control.

ANSI/ANS-8.1 Section 4.1.5

Deviations from procedures and unforeseen alterations in process conditions that affect nuclear criticality safety shall be reported to management and shall be investigated promptly. Action shall be taken to prevent a recurrence.

ANSI/ANS-8.1 Section 4.1.6

Operations shall be reviewed frequently (at least annually) to ascertain that procedures are being followed and that process conditions have not been altered so as to affect the nuclear criticality safety evaluation. These reviews shall be conducted, in consultation with operating personnel, by individuals who are knowledgeable in nuclear criticality safety and who, to the extent practicable, are not immediately responsible for the operation.

ANSI/ANS-8.1 Section 4.1.7

Emergency procedures shall be prepared and approved by management. Organizations, local and offsite, that are expected to respond to emergencies shall be made aware of conditions that might be encountered, and they should be assisted in preparing suitable procedures governing their responses.

ANSI/ANS-8.1 Section 4.2.1

Controlling Factors. The effective multiplication factor (k eff) of a system containing fissionable material depends on:

(1) The mass and distribution of all fissionable materials and

18.0 NUCLEAR SAFETY

(2) The mass, distribution, and nuclear properties of all other materials with which the fissionable materials are associated.

Nuclear criticality safety is achieved by controlling one or more parameters of the system within subcritical limits.

All controlled parameters and their limits shall be specified.

ANSI/ANS-8.1 Section 4.2.4

Neutron Absorbers. Reliance may be placed on neutron-absorbing materials, such as cadmium and boron, that are incorporated in process materials or equipment, or both. Control shall be exercised to maintain their continued presence with the intended distributions and concentrations. Extraordinary care should be taken with solutions of absorbers because of the difficulty of exercising such control.

ANSI/ANS-8.1 Section 4.2.5

Subcritical Limits.
Where applicable data are available, subcritical limits shall be established on bases derived from experiments, with adequate allowance for uncertainties in the data. In the absence of directly applicable experimental measurements, the limits may be derived from calculations made by a method shown by comparison with experimental data to be valid in accordance with 4.3.

ANSI/ANS-8.1 Section 4.3.1

Validation Calculational Method. Bias shall be established by correlating the results of criticality experiments with results obtained for these same systems by the method being validated.

ANSI/ANS-8.1 Section 4.3.2

The area(s) of applicability of a calculational method may be extended beyond the range of experimental conditions over which the bias is established by making use of the trends in the bias. Where the extension is large, the method should be supplemented by other calculational methods to provide a better estimate of the bias in the extended area(s).

ANSI/ANS-8.1 Section 4.3.3

A margin in the correlating parameter, which margin may be a function of composition and other variables, shall be prescribed that is sufficient to ensure subcriticality. This margin of subcriticality shall include allowances for the uncertainty in the bias and for uncertainties due to any extensions of the area(s) of applicability.

ANSI/ANS-8.1 Section 4.3.4

If the method involves a computer program, checks shall be performed to confirm that the mathematical operations are performed as intended. Any changes in the computer program shall be followed by reconfirmation that the mathematical operations are performed as intended.

ANSI/ANS-8.1 Section 4.3.6

A written report of the validation shall be prepared. This report shall:

- Describe the method with sufficient detail, clarity, and lack of ambiguity to allow independent duplication of results.

- State computer programs used, the options, reasons for choosing mesh points where applicable, the cross section sets, and any numerical parameters necessary to describe the input.

- Identify experimental data and list parameters derived therefrom for use in the validation of the method.

- State the area(s) of applicability.

- State the bias and the prescribed margin of subcriticality over the area(s) of applicability. State the basis for the margin.

DOE5480.24 Section 7.a(2)

REQUIREMENTS. The contractor criticality safety program for nuclear facilities shall include the following requirements:

18.0 NUCLEAR SAFETY

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-8.19, "Administrative Practices for Nuclear Criticality Safety."

ANS-8.7, "Guide for Nuclear Criticality Safety in the Storage of Fissile Materials."

(2) For DOE application, the following sections of ANS-8.1, "Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors," shall read as follows:

4.2.2 Double Contingency Principle. Process designs shall incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible. Protection shall be provided by either (a) the control of two independent process parameters (which is the preferred approach, if practical) or (b) a system of multiple (at least two) controls on a single parameter. In all cases, no single failure shall result in the potential for a criticality accident. The basis for selecting either approach shall be fully documented.

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.

DOE5480.24 Section 7.b(3)

The requirements in ANSI/ANS-8.3 relating to the needs for an alarm system are not applicable to this Order. For the purpose of this Order, Criticality Alarm Systems (CAS) and criticality detection systems shall be required as follows:

(3) In those cases where the mass of fissionable material exceeds the limits established in paragraph 4.2.1 of ANSI/ANS-8.3, but a criticality accident is determined to be impossible due to the physical form of the fissionable material, or the probability of occurrence is determined to be less than 10/-6 per year (as documented in a DOE approved SAR), neither a CAS nor a criticality detection system is required. In addition, neither a CAS nor a criticality detection system is required to be installed underwater when fissionable material is handled or stored beneath water shielding that is adequate to protect personnel; however a means to detect fission product gasses or other volatile fission products should be provided in occupied areas immediately adjacent to such underwater storage areas except for fuel systems where no fission products are likely to be released. Also, neither a CAS nor a criticality detection system are required for fissionable material during shipment of fissionable material packaged in approved shipping containers, or fissionable material packaged in approved shipping containers awaiting transport provided no other operation involving fissionable material not so packaged is permitted on the dock or in the shipment area.

DOE5480.24 Section 7.b(4)

The requirements in ANSI/ANS-8.3 relating to the needs for an alarm system are not applicable to this Order. For the purpose of this Order, Criticality Alarm Systems (CAS) and criticality detection systems shall be required as follows:

(4) The decision to install a criticality detection system rather than a CAS, and the decision that neither a CAS nor a criticality detection system is necessary, must be justified based upon a documented DOE approved Safety Analysis.

DOE6430.1A Section 1300-4

Nuclear Criticality Safety.
An assessment of design shall be made as early as practical to determine if the potential for nuclear criticality exists. When such potential exists, the design of nuclear criticality control provisions, including equipment and procedure, shall meet, as a minimum, the requirements of DOE

18.0 NUCLEAR SAFETY

5480.5 and the ANS 8 series on Nuclear Criticality Safety.

DOE6430.1A Section 1300-4.3

The design shall ensure that material shall not be displaced or allowed to accumulate to form a critical mass in the event of an internal or external accident. The design shall emphasize geometrically favorable compartments or spacing to minimize reliance on administrative control, and shall prevent the unsafe accumulation of moderator or reflection materials (e.g., water from a fire sprinkler system). Also, heating or cooling jackets in the safe dimension of geometrically safe vessels shall preclude a leak in the jacket that causes an increase in the system's reactivity.

DOE6430.1A Section 1300-4.8

Nuclear criticality safety shall be achieved by exercising control over both the quantity and distribution of all fissile materials and other materials capable of sustaining a chain reaction, and over the quantities, distributions, and nuclear properties of all other materials with which fissile materials and other materials capable of sustaining a chain reaction are associated. Design considerations for establishing such controls shall be mass, density, geometry, moderation, reflection, enrichment, interaction, material types, and nuclear poison.

DOE6430.1A Section 1300-4.9

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

ANS8.7/ANSIN16.5 Section 4.1.2

Methods of storage control and operational practices approved by management shall be described in written procedures. Persons participating in the transfer and storage of material shall be familiar with these procedures. Limits for storage shall be posted.

ANS8.7/ANSIN16.5 Section 4.2.3

Storage of fissile materials shall be such as to obviate concern with accidental nuclear criticality in the event of fire, flood, earthquake, or other natural calamities.

ANSI/ANS-8.19-84 Section 9.1

The movement of fissile materials shall be controlled.

ANSI/ANS-8.19-84 Section 9.2

Appropriate material labeling and area posting shall be maintained specifying material identification and all limits on parameters that are subject to procedural control.

ANSI/ANS-8.19-84 Section 9.2.b

Appropriate material labeling and area posting shall be maintained specifying < > all limits on parameters that are subject to procedural control.

ANSI/ANS-8.19-84 Section 9.4

Access to areas where fissile material is handled, processed, or stored shall be controlled.

ANSI/ANS-8.19-84 Section 9.5

Control of spacing, mass, density, and geometry of fissile material shall be maintained to assure subcriticality under all normal and credible abnormal conditions.

DOE5480.24 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.

DOE5480.24 Section 7.e(1)

Transportation and Storage Requirements for Fissionable Material.

18.0 NUCLEAR SAFETY

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.

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19.0 OCCUPATIONAL SAFETY AND HEALTH

19.0 OCCUPATIONAL SAFETY AND HEALTH

19.1.1 Program Policy and Procedures

DOE5480.10 Section 9

Requirements. The manager of the contractor organization performing the actual work or job-related task shall assure compliance with the requirements of this paragraph. These requirements are necessary elements for implementing and maintaining an effective industrial hygiene program and providing protection in accordance with the standards of DOE 5480.4, Attachment 2, paragraph 2.d.(3).

DOE5480.10 Section 9.a(1)

The Operating Organization having line safety and health responsibilities should be required to: (a) conduct operations consistent with established health and safety procedures;

DOE5480.10 Section 9.a(2)

The Medical Organization should be required to: (a) maintain records of occupational illnesses in accordance with the recordkeeping requirements of Title 29 CFR 1904; (b) consult with the industrial hygiene staff on the need for job-related medical examinations or bioassays, (c) alert the industrial hygiene staff to all suspected occupational illnesses to facilitate early evaluations and correction of problems; and (d) include the industrial hygiene staff, if appropriate, in the investigations of occupational illnesses.

DOE5480.10 Section 9.b(1)

Functions. The industrial hygiene program shall be designed to preserve employee health and well-being. This shall be accomplished by identification, evaluation, and control of environmental factors and stresses found in the workplace. These environmental factors and stresses include: chemical (e.g., liquid, particulate, vapor, and gas); physical (e.g., electromagnetic radiation, noise, vibration, and magnetic fields); biological (e.g., agents of infectious diseases); and ergonomic (e.g., body position in relation to task, repetitive motion, and mental or physical fatigue). The contractor industrial hygiene program must have the following features:

(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.

DOE5483.1A Chapter 1.1

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.

DOE5483.1A Chapter I, Section 4.a

a. Temporary Variances.

(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

19.0 OCCUPATIONAL SAFETY AND HEALTH

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 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 thcontractor 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.

DOE5483.1A 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 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.

19.0 OCCUPATIONAL SAFETY AND HEALTH

19.2.1 Hazard Assessment Program

29CFR1910 Part 95(a)

Occupational noise exposure
(a) Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in Table G-16(not shown) when measured on the A scale of a standard sound level meter at slow response. When noise levels are determined by octave band analysis, the equivalent A-weighted sound level may be determined as follows: (Figure G-9 not shown).

29CFR1910 Part 95(k)

Training program.

(1) The employer shall institute a training program for all employees who are exposed to noise at or above an 8-hour time-weighted average of 85 decibels, and shall ensure employee participation in such program.

(2) The training program shall be repeated annually for each employee included in the hearing conservation program. Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.

(3) The employer shall ensure that each employee is informed of the following:

(i) The effects if noise on hearing;
(ii) The purpose of hearing protectors, the advantages, the disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care; and
(iii) The purpose of audiometric testing, and an explanation of the test procedures.

29CFR1910 Part 132(d)(2)

The employer shall verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment.

29CFR1910 Part 146(c)(1)

General requirements.
The employer shall evaluate the workplace to determine if any spaces are permit-required confined spaces.

29CFR1910 Part 146(c)(2)

If the workplace contains permit spaces, the employer shall inform exposed employees, by posting danger signs or by any other equally effective means, of the existence and location of and the danger posed by the permit spaces.

Note: A sign reading "DANGER - PERMIT REQUIRED CONFINED SPACE. DO NOT ENTER" or using other similar language would satisfy the repetition for a

29CFR1910 Part 146(c)(3)

If the employer decides that its employees will not enter permit spaces, the employer shall take effective measures to prevent its employees from entering the permit spaces and shall comply with paragraphs (c)(1), (c)(2), (c)(6), and (c)(8) of this section.

29CFR1910 Part 146(c)(4)

If the employer decides that its employees will enter permit spaces the employer shall develop and implement a written permit space program that complies with this section. The written program shall be available for inspection by employees and their authorized representatives.

29CFR1910 Part 146(d)

Permit-required confined space program (permit space program). Under the permit space program required by paragraph (c)(4) of this section, the employer shall:

19.0 OCCUPATIONAL SAFETY AND HEALTH

(1) Implement the measures necessary to prevent unauthorized entry;

29CFR1910 Part 146(d)(2)

Identify and evaluate the hazards of permit spaces before employees enter them;

DOE5480.10 Section 9.b(1)

Functions. The industrial hygiene program shall be designed to preserve employee health and well-being. This shall be accomplished by identification, evaluation, and control of environmental factors and stresses found in the workplace. These environmental factors and stresses include: chemical (e.g., liquid, particulate, vapor, and gas); physical (e.g., electromagnetic radiation, noise, vibration, and magnetic fields); biological (e.g., agents of infectious diseases); and ergonomic (e.g., body position in relation to task, repetitive motion, and mental or physical fatigue). The contractor industrial hygiene program must have the following features:

(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.

19.2.2 Hazard Reporting System

29CFR1910 Part 146(c)(2)

If the workplace contains permit spaces, the employer shall inform exposed employees, by posting danger signs or by any other equally effective means, of the existence and location of and the danger posed by the permit spaces.

Note: A sign reading "DANGER - PERMIT REQUIRED CONFINED SPACE. DO NOT ENTER" or using other similar language would satisfy the repetition for a

DOE5480.10 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.

DOE5483.1A Chapter II, 1

a. Initially, contractor employees or representatives thereof should attempt resolution of their complaints by submitting to their contractor management, either directly or through their authorized employee representative, reports of any conditions or practices which they consider hazardous to their safety or health, or which they believe are in violation of the DOE-prescribed OSHA standards.

b. Contractor employees or their representatives may submit complaints directly to the DOE field organization safety and health manager or the CO or CO representative, particularly in situations where the complainant wishes to remain anonymous (to the contractor), or where the complainant believes that unsafe/unhealthful conditions still exist or violations of standards still
remain after being brought to the attention of and addressed by contractor management.

c. Complaints may be submitted to either contractor management or to the DOE by completing DOE F 5480.4 (Attachment II-1), by sending a letter or telegram, or by oral means. Oral complaints shall be recorded on DOE F 5480.4 by DOE and/or the contractor. Irrespective of the means of submission, the complaint should set forth with reasonable particularity the pertinent facts and circumstances involved. In all situations where the complaint is submitted to DOE and anonymity is requested by the complainant, the DOE shall not divulge the complainant's identity to contractor personnel or to any other persons not essential to the processing and investigation of the complaint.

DOE5483.1A Chapter II, Section 1.a

Initially, contractor employees or representatives thereof should attempt a resolution of their complaints by submitting to their contractor management, either directly or through their authorized employee representative, reports of any conditions or practices which they consider hazardous to their safety or health, or which they believe are in violation of the DOE prescribed OSHA standards.

19.0 OCCUPATIONAL SAFETY AND HEALTH

DOE5483.1A Chapter II, Section 1.b

Contractor employees or their representatives may submit complaints directly to the DOE field organization safety and health manager or the CO or CO representative, particularly in situations where the complainant wishes to remain anonymous (to the contractor), or where the complainant believes that unsafe/unhealthful conditions still exist or violations of standards still remain after being brought to the attention of and addressed by contractor personnel.

DOE5483.1A Chapter II, Section 2

a. Should the contractor receive a complaint from an employee or an authorized representative, the contractor shall confer with the employee or the authorized representative and conduct a joint inspection of the conditions or circumstances identified by the complaint.

b. Should the field organization receive a complaint, the facts and circumstances of the complaint shall be reviewed and, if determined necessary by the DOE, an inspection shall be made to investigate the complaint allegations within 15 days of receipt of the complaint. However, the inspection should be made as immediately as is possible. In making the inspection, the same procedures set forth on pages I-5 through I-7, paragraphs 6b-g, shall apply. Follow-up compliance inspections shall be conducted, as appropriate.

DOE5483.1A Chapter II, Section 3

IMMINENT DANGER COMPLAINTS - SUBMISSION AND INSPECTION.

a. Any employee or authorized representative of employees who believes thatan imminent danger exists, shall bring this matter to the attention of the appropriate contractor, supervisor, or designated official. If the imminent danger is determined to be valid, the contractor shall take immediate and effective remedial actions to remove employees from the danger area and/or eliminate the danger. The contractor shall conduct an inspection as soon as possible thereafter to assure that appropriate actions have been taken to preclude recurrence of the imminent danger situation.

b. The employee or the authorized representative also may visit or call the DOE at the field organization level to request an immediate elimination of the danger and an inspection of the alleged imminent danger situation. DOE shall ascertain immediately whether there is a reasonable basis for the imminent danger complaint. If the complaint is determined to be valid, DOE shall take immediate and effective actions to remove employees from the danger area and/or eliminate the danger. This may be accomplished by conducting an immediate DOE inspection and/or by contacting the contractor immediately. In any event DOE shall conduct an inspection as soon as possible to assure that appropriate actions have been taken to preclude recurrence of the imminent danger situation. In making the inspection, the same procedures set forth on pages I-5 through I-7, paragraphs 6b-g, shall apply. Follow-up compliance inspections shall be conducted as appropriate.

DOE5483.1A Chapter II, Section 4

a. The contractor shall inform each complainant of the results of the inspection and the actions taken to address and/or correct the safety and health concerns, problems, and/or violations of the DOE-prescribed OSHA standards noted by a complaint filed with the contractor.

b. For complaints filed with DOE, DOE shall provide a written response to the complainant within 15 days after the completion of the complaint inspection, except, obviously, in those situations where the complainant's identity cannot be determined. The response shall be sent to the complainant's home address, unless he or she has specifically requested that mail be sent to his or her place of employment. The response shall provide the results of the DOE inspection prompted by the complaint, and shall document all actions taken on complaint-related allegations of unsafe/unhealthful conditions and/or violations of the DOE-prescribed OSHA standards. If it is determined that no inspection is necessary, DOE shall respond to the complainant within 15 days of receipt of the complaint and state why an inspection was not conducted.

DOE5483.1A Chapter II, Section 5

5. COMPLAINT RESOLUTION. Contractor employees or representatives thereof who are not satisfied with the adequacy or effectiveness of the field organization's investigation of or response to their complaint allegations may submit a written request for complaint resolution to the Director of Operational Safety (EP-32). The request must include the pertinent facts and particulars, and the basis for the request (e.g., inadequate action taken on violation of a standard, or no employee or representative allowed to participate in inspection), along with a copy of the original complaint and the field organization's response thereto. EP-32 shall conduct an investigation of the situation, in coordination with the appropriate program office(s). Within 30 days of receipt of the request, EP-32 shall

19.0 OCCUPATIONAL SAFETY AND HEALTH

provide a written response to the employee or representative thereof, and to the field organization. The response shall indicate the actions taken or planned as a result of the request for complaint resolution.

DOE5483.1A Chapter III, 1

1. NONDISCRIMINATION.

a. No contractor shall discharge or in any manner demote, reduce in pay, coerce, restrain, threaten, or take any other negative actions against any contractor employee as a result of the employee's filing of a complaint, or in any other fashion, exercising on behalf of himself or herself or others any right set forth in this Order.

b. Any employee who believes he or she has been discharged or in any other manner discriminated against, in violation of this Order, may file a complaint with the cognizant CO or CO representative within 30 days after the alleged discrimination, setting forth the nature of the alleged discrimination. The CO or CO representative, the safety and health director, and other appropriate elements of the field organization shall investigate the complaint, and if it is found that such discrimination has occurred, the field organization shall assure that appropriate measures are taken by the contractor, including rehiring or reinstatement of the employee, restoration of lost seniority, and back pay. The field organization shall report the disposition of the matter to the contractor employee filing the complaint of alleged discrimination within 30 days after receipt of the complaint.

19.2.3 Investigation of Occurrences, Accidents, and Near Misses

DOE5480.10 Section 9.a(2)

The Medical Organization should be required to: (a) maintain records of occupational illnesses in accordance with the recordkeeping requirements of Title 29 CFR 1904; (b) consult with the industrial hygiene staff on the need for job-related medical examinations or bioassays; (c) alert the industrial hygiene staff to all suspected occupational illnesses to facilitate early evaluations and correction of problems; and (d) include the industrial hygiene staff, if appropriate, in the investigations of occupational illnesses.

DOE5483.1A Chapter III, 1

1. NONDISCRIMINATION.

a. No contractor shall discharge or in any manner demote, reduce in pay, coerce, restrain, threaten, or take any other negative actions against any contractor employee as a result of the employee's filing of a complaint, or in any other fashion, exercising on behalf of himself or herself or others any right set forth in this Order.

b. Any employee who believes he or she has been discharged or in any other manner discriminated against, in violation of this Order, may file a complaint with the cognizant CO or CO representative within 30 days after the alleged discrimination, setting forth the nature of the alleged discrimination. The CO or CO representative, the safety and health director, and other appropriate elements of the field organization shall investigate the complaint, and if it is found that such discrimination has occurred, the field organization shall assure that appropriate measures are taken by the contractor, including rehiring or reinstatement of the employee, restoration of lost seniority, and back pay. The field organization shall report the disposition of the matter to the contractor employee filing the complaint of alleged discrimination within 30 days after receipt of the complaint.

DOE5483.1A Chapter III, Section 4

ACCIDENT INVESTIGATIONS. Accident investigations shall be conducted in accordance with DOE 5484.1, ENVIRONMENTAL PROTECTION, SAFETY, AND HEALTH PROTECTION INFORMATION REPORTING REQUIREMENTS, of 2-24-81.

19.0 OCCUPATIONAL SAFETY AND HEALTH

19.2.5 Occupational Safety and Health Inventory System

DOE5480.10 Section 9.b(1)

Functions. The industrial hygiene program shall be designed to preserve employee health and well-being. This shall be accomplished by identification, evaluation, and control of environmental factors and stresses found in the workplace. These environmental factors and stresses include: chemical (e.g., liquid, particulate, vapor, and gas); physical (e.g., electromagnetic radiation, noise, vibration, and magnetic fields); biological (e.g., agents of infectious diseases); and ergonomic (e.g., body position in relation to task, repetitive motion, and mental or physical fatigue). The contractor industrial hygiene program must have the following features:

(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.

DOE5480.10 Section 9.f(1)

Recordkeeping Requirements
(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.

DOE5480.10 Section 9.f(5)

Industrial hygiene hazard inventories, reports, and monitoring data shall be readily accessible to the medical organization responsible for operating the medical monitoring program. Records access shall be provided to employees or designated representatives of employees in accordance with OSHA Regulation 29 CFR 1910.20 and DOE Privacy Act Regulation 10 CFR 1008.17(b)(5).

19.3.1 Hazard Monitoring, Sampling, and Surveillance

29CFR1910 Part 95(d)

Monitoring.

(1) When information indicates that any employee's exposure may equal or exceed an 8-hour time-weighted average of 85 decibels, the employer shall develop and implement a monitoring program.

(i) The sampling strategy shall be designed to identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors.
(ii) Where circumstances such as high worker mobility, significant variations in sound level, or a significant component of impulse noise make area monitoring generally inappropriate, the employer shall use representative personal sampling to comply with the monitoring requirements of this paragraph unless the employer can show that area sampling produces equivalent results.

(2)

(i) All continuous, intermittent and impulsive sound levels from 80 decibels to 130 decibels shall be integrated into the noise measurements.
(ii) Instruments used to measure employee noise exposure shall be calibrated to ensure measurement accuracy.

(3) Monitoring shall be repeated whenever a change in production, process, equipment or control increases noise exposures to the extent that:

(i) Additional employees may be exposed at or above the action level; or
(ii) The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of paragraph (j) of this section.

29CFR1910 Part 95(f)

Occupational noise exposure

19.0 OCCUPATIONAL SAFETY AND HEALTH

(f) Observation of monitoring. The employer shall provide affected employees of their representatives with an opportunity to observe any noise measurements conducted pursuant to this section.

29CFR1910 Part 1001(c)(2)

Asbestos
(c) Permissible exposure limits (PELS) - (2) Excursion limit. The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes.

29CFR1910 Part 1001(d)(1)

Asbestos
(d) Exposure monitoring - (1) General. (i) Determinations of employee exposure shall be made from breathing zone air samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee. (ii) Representative 8-hour TWA employee exposures shall be determined on the basis of one or more samples representing full-shift exposures for each shift for each employee in each job classification in each work area. Representative 30-minute short-term employee exposures shall be determined on the basis of one or more samples representing 30 minute exposures associated with operations that are most likely to produce exposures above the excursion limit for each shift for each job classification in each work area.

29CFR1910 Part 1001(d)(2)

Asbestos
(d) Exposure monitoring. (2) Initial monitoring. (i) Each employer who has a workplace or work operation covered by this standard, except as provided for in paragraphs (d)(2)(ii) and (d)(2)(iii) of this section, shall perform initial monitoring of employees who are, or may reasonably be expected to be exposed to airborne concentrations at or above the action level and/or excursion limit.

29CFR1910 Part 1001(d)(3)

Asbestos
(d) Exposure monitoring. (3) Monitoring frequency (periodic monitoring) and patterns. After the initial determinations required by paragraph (d)(2)(i) of this section, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the employees. In no case shall sampling be at intervals greater than six months for employees whose exposures may reasonably be foreseen to exceed the action level and/or excursion limit.

29CFR1910 Part 1001(d)(4)

Asbestos
(d) Exposure monitoring. (4) Changes in monitoring frequency. If either the initial or the periodic monitoring required by paragraphs (d)(2) and (d)(3) of this section statistically indicates that employee exposures are below the action level and/or excursion limit, the employer may discontinue the monitoring for those employees whose exposures are represented by such monitoring.

29CFR1910 Part 1001(d)(5)

Asbestos
(d) Exposure monitoring. (5) Additional monitoring. Notwithstanding the provisions of paragraphs (d)(2)(ii) and (d)(4) of this section, the employer shall institute the exposure monitoring required under paragraphs (d)(2)(i) and (d)(3) of this section whenever there has been a change in the production, process, control equipment, personnel or work practices that may result in new or additional exposures above the action level and/or excursion limit or when the employer has any reason to suspect that a change may result in new or additional exposures above the action level and/or excursion limit.

29CFR1910 Part 1001(d)(6)[i-ii]

Asbestos - Method of monitoring.
(i) All samples taken to satisfy the monitoring requirements of paragraph (d) shall be personal samples collected following the procedures specified in appendix A.

(ii) All samples taken to satisfy the monitoring requirements of paragraph (d) shall be evaluated using the OSHA Reference Method (ORM) specified in Appendix A of this section, or an equivalent counting method.

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 1001(d)(7)

Asbestos
(d) Exposure monitoring. (7) Employee notification of monitoring results. (i) The employer shall, within 15 working days after the receipt of the results of any monitoring performed under the standard, notify the affected employees of these results in writing either individually or by posting of results in an appropriate location that is accessible to affected employees. (ii) The written notification required by paragraph (d)(7)(i) of this section shall contain the corrective action being taken by the employer to reduce employee exposure to or below the TWA and/or excursion limit, wherever monitoring results indicated that the TWA and/or excursion limit had been exceeded.

DOE5480.10 Section 9.b Paragraph (1)

Function. The industrial hygiene program shall be designed to preserve employee health and well-being. This shall be accomplished by identification, evaluation and control of environmental factors and stresses found in the workplace. These environmental factors and stresses include: chemical (e. g., liquid, particulate, vapor, and gas); physical (e.g., electromagnetic radiation, noise, vibration, and magnetic fields); biological (e.g., agents of infectious diseases); and ergonomic (e.g., body position in relation to task, repetitive motion, and mental or physical fatigue). The contractor industrial hygiene program must have the following features: (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 inter organizational communication; the review of proposed projects, facilities, engineering plan, specifications; and maintenance of a hazards inventory or tracking system.

DOE5480.10 Section 9.b(2)

Hazard Evaluation. Once potential health hazards are identified, the industrial hygiene staff must determine the extent of the hazard through appropriate consultation with other professionals, sound judgment, and the application of established standards or guides and such evaluation techniques as air sampling and bioassay. 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)).

DOE5480.10 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.

DOE5483.1A 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.

19.0 OCCUPATIONAL SAFETY AND HEALTH

19.3.2 Hazard Controls

29CFR1910 Part 22(a)(1)

Housekeeping - All places of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition.

29CFR1910 Part 22(d)(1)

Floor loading protection - In every building or other structure, or part thereof, used for mercantile, business, industrial, or storage purposes, the loads approved by the building official shall be marked on plates of approved design which shall be supplied and securely affixed by the owner of the building, or his duly authorized agent, in a conspicuous place in each space to which they relate. Such plates shall not be removed or defaced but, if lost, removed, or defaced, shall be replaced by the owner or his agent.

29CFR1910 Part 23(a)(1)

Protection for floor openings - Every stairway floor opening shall be guarded by a standard railing constructed in accordance with paragraph (c) of this section. The railing shall be provided on all exposed sides (except at entrance to stairway).

29CFR1910 Part 23(d)(1)

Stairway railings and guards - Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails as specified in paragraphs (d)(1)(i) through (v) of this section, the width of the stair to be measured clear of all obstructions except handrails.

29CFR1910 Part 25(c)(2)

Portable stepladders - Stepladders longer than 20 feet shall not be supplied. Stepladders as hereinafter specified will be of three types:
Type I - Industrial stepladder, 3 to 20 feet for heavy duty, such as utilities, contractors, and industrial use.
Type II - Commercial stepladder, 3 to 12 feet for medium duty, such as painters, offices, and light industrial use.
Type III - Household stepladder, 3 to 6 feet for light duty, such as light household use.

29CFR1910 Part 25(c)(3)(ii)

Portable Rung Ladders - Single ladders longer than 30 feet shall not be supplied.

29CFR1910 Part 25(c)(3)(iii)

Portable Rung Ladders - Two-section extension ladders longer than 60 feet shall not be supplied. All ladders of this type shall consist of two sections, one to fit within the side rails of the other, and arranged in such a manner that the upper section can be raised and lowered.

29CFR1910 Part 25(c)(4)(ii)

Special-Purpose Ladders - Painter's stepladders longer than 12 feet shall not be supplied.

29CFR1910 Part 25(c)(4)(iii)

Special-Purpose Ladders - Mason's ladder is a special type of single ladder intended for use in heavy construction work. (a) Mason's ladder longer than 40 feet shall not be supplied.

29CFR1910 Part 36(b)(1)

Means of Egress - General - Every building or structure, new or old, designed for human occupancy shall be provided with exits sufficient to permit the prompt excape of occupants in case of fire or other emergency. The design of exits and other safeguards shall be such that reliance fro safety to life in case of fire or other emergency will not depend solely on any singel safeguard; additional safeguards shall be provided for life safety in case any single safeguard is ineffective due to some human or mechanical failure.

29CFR1910 Part 36(b)(2)

Means of Egress - General - Every building or structure shall be so constructed, arranged, equipped, maintained, and operated as to avoid undue danger to the lives and safety of its occupants from fire, smoke, fumes, or resulting panic during the period of time reasonably necessary for escape from the building or structure in case of fire or other emergency.

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 36(b)(3)

Means of Egress - General - Every building or structure shall be provided with exits of kinds, numbers, location, and capacity appropriate to the individual building or structure, with due regard to the character of the occupancy, the number of persons exposed, the fire protection available, and the height and type of construction of the building or structure, to afford all occupants convenient facilities for escape.

29CFR1910 Part 36(b)(5)

Means of Egress - General - Every exit shall be clearly visible or the route to reach it shall be conspicuously indicated in such a manner that every occupant of every building or structure who is physically and mentally capable will readily know the direction of escape from any point, and each path of escape, in its entirety, shall be so arranged or marked that the way to a place of safety outside is unmistakable. Any doorway or passageway not constituting an exit or way to reach an exit, but of such a character as to be subject to being mistaken for an exit, shall be so arranged or marked as to minimize its possible confusion with an exit and the resultant danger of persons endeavoring to escape from fire finding themselves trapped in a dead-end space, such as a cellar or storeroom, from which there is no other way out.

29CFR1910 Part 36(b)(6)

Means of Egress - General - In every building or structure equipped for artificial illumination, adequate and reliable illumination shall be provided for all exit facilities.

29CFR1910 Part 36(b)(8)

Means of Egress - General - In every building or structure, section or area thereof of such size, occupancy, and arrangement that the reasonalble safety of numbers of oclcupants may be endangered by the blocking of any single means of egress due to fire or smoke, shall have at least tow means of egress remote from each other, so arranged as to minimize any possiblilty that both may be blocked by any one fire or other emergency conditions.

29CFR1910 Part 36(c)(1)

Means of Egress - Protection of Employees Exposed by Construction and Repair Operations. - No building or structure under construction shall be occupied in whole or in part until all exit facilities required for the part occupied are completed and ready for use.

29CFR1910 Part 36(c)(2)

Means of Egress - Protection of Employees Exposed by Construction and Repair Operations. - No existing building shall be occupied during repairs or alterations unless all existing exits and any existing fire protection are continuously maintianed, or in leiu therof other measures are taken which provide equivalent safety.

29CFR1910 Part 36(d)(1)

Means of Egress - Maintenance. - Every required exit, way of approach thereto, and way of travel from the exit into the street or open space, shall be continuously maintianed free of all obstructions or impediments to full instant use in the case of fire or other emergency.

29CFR1910 Part 36(d)(2)

Means of Egress - Maintenance. - Every automatic sprinkler system fire detection and alarm system, exit lighting, fire door, and other item of equipment, where provided, shall be continuously in proper operating condition.

29CFR1910 Part 37(f)(6)

Means of Egress - Access to Exits - The minimum width of any way of exit access shall in no case be less than 28 inches. Where a single way of exit access leads to an exit its capacity in terms of width shall be at least equal to the required capacity of the exit to which it leads. Where more than one way of exit access leads to an exit, each shall have a width adequate for the number of persons it must accomodate.

29CFR1910 Part 37(k)(2)

Means of Egress - Maintenance and Workmanship - Means of egress shall be continuously maintained free of all obstructions or impediments to full instant use in the case of fire or other emergency.

29CFR1910 Part 37(q)(1)

Means of Egress - Exit Marking - Exits shall be marked by a readily visible sign. Access to exits shall be marked by readily visible signs in all cases where the exit or way to reach it is not immediately visible to the occupants.

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 95(b)

Occupational noise exposure

(b)(1) When employees are subjected to sounds exceeding those listed in Table G-16 (not shown), feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table G-16(not shown), personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.

(2) If the variations in noise level involve maxima at intervals of 1 second or less, it is to be considered continuous. (Table G-16 not shown).

29CFR1910 Part 95(c)

Occupational noise exposure

(c) Hearing conservation program.

(1) The employer shall administer a continuing, effective hearing conservation program, as described in paragraphs (c) through (o) of this section, whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level (TWA) of 85 decibels measured on the A scale (slow response) or, equivalently, a dose of fifty percent. For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with Appendix A and Table G-16a, and without regard to any attenuation provided by the use of personal protective equipment.

(2) For purposes of paragraphs (c) through (n) of this section, an 8-hour time-weighted average of 85 decibels or a dose of fifty percent shall also be referred to as the action level.

29CFR1910 Part 101(b)

Hazardous Materials - Compressed gases - The in-plant handling, storage, and utilization of all compressed gases in cylinders, portable tanks, rail tankcars, or motor vehicle cargo tanks shall be in accordance with Compressed Gas Association Pamphlet P-1-1965.

29CFR1910 Part 147(c)(5)(i)

Lockout and Tagout
(i) Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware shall be provided by the employer for isolating, securing or blocking of machines or equipment from energy sources.

29CFR1910 Part 147(c)(5)(ii)(A)

Lockout and Tagout
(ii) Lockout devices and target devices shall be singularly identified; shall be the only devices(s) used for controlling energy; shall not be used for other purposes; and shall meet the following requirements:
(A) Durable
(1) Lockout and tagout devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.
(2) Tagout devices shall be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.
(3) Tags shall not deteriorate when used in corrosive environments such as areas where acid an alkali chemicals are handled and stored.

29CFR1910 Part 147(c)(5)(ii)(B)

Lockout and Tagout
(B) Standardized. Lockout and tagout devices shall be standardized within the facility in at least one of the following criteria: color; shape; or size; and additionally, in the case of tagout devices, a print and format shall be standardized.

29CFR1910 Part 147(c)(5)(ii)(C)(1)

Lockout and Tagout
(C) Substantial-(1) Lockout devices. Lockout devices shall be substantial enough to prevent removal without the use of excessive force or

unusual techniques, such as with the use of bolt cutters or other metal cutting tools.

29CFR1910 Part 147(c)(5)(ii)(C)(2)

Lockout and Tagout
(C) Substantial-(2) Tagout devices, including and their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.

29CFR1910 Part 147(d)(1)

Preparation for shutdown. Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

29CFR1910 Part 212(a)(1), Sentence 1

Maching Guarding - One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks.

29CFR1910 Part 252(a)(1)(i)

Welding, Cutting, and Brazing - Fire Hazards - If the object to be welded or cut cannot readily be moved, all movable fire hazards in the vicinity shall be taken to a safe place.

29CFR1910 Part 252(a)(1)(ii)

Welding, Cutting, and Brazing - Guards - If the object to be welded or cut cannot be moved and if all the fire hazards connot be removed, then guards shall be used to confine the heat, sparks, and slag, and to protect the immovable fire hazards.

29CFR1910 Part 252(a)(1)(iii)

Welding, Cutting, and Brazing - Restrictions - If the requirements stated in paragraphs (a)(1)(i) and (a)(1)(ii) of this section cannot be followed then welding and cutting shall not be performed.

29CFR1910 Part 252(a)(2)(iv)

Welding, Cutting, and Brazing - Authorization - Before cutting or welding is permitted, the area shall be inspected by the individual responsible for authorizing cutting and welding operations. He shall designate precaustions to be followed in granting authorization to proceed preferably in the form of a written permit.

29CFR1910 Part 305(j)(4)(i)

In sight from. If specified that one piece of equipment shall be "in sight from" another piece of equipment, one shall be visible and not more than 50 feet from the other.

29CFR1910 Part 305(j)(4)(ii)(C)

If a motor and the driven machinery are not in sight from the controller location, the installation shall comply with one of the following conditions:
(1) The controller disconnecting means shall be capable of being locked in the open position.
(2) A manually operable switch that will disconnect the motor from its source of supply shall be placed in sight from the motor location.

29CFR1910 Part 305(j)(4)(ii)(D)

The disconnecting means shall plainly indicate whether it is in the open (off) or closed (on) position.

29CFR1910 Part 333(c)(4)

Illumination

(i) Employees may not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely.

19.0 OCCUPATIONAL SAFETY AND HEALTH

(ii) Where lack of illumination or an obstruction precludes observation of the work to be performed, employees may not perform tasks near exposed energized parts. Employees may not reach blindly into areas which may contain energized parts.

29CFR1910 Part 333(c)(10)

Selection and use of work practices
(10) Interlocks. Only a qualified person following the requirements of paragraph (c) of this section may defeat an electrical safety interlock, and then only temporarily while he or she is working on the equipment. The interlock system shall be returned to its operable condition when this work is completed.

29CFR1910 Part 1025(c)(1)

Lead - Permissible Exposure Limit - The employer shall assure that no employee is exposed to lead at concentrations greater than fifty micrograms per cubic meter of air averaged over an 8-hour period.

29CFR1910 Part 1025(c)(2)

Lead - Permissible Exposure Limit - If an employee is exposed to lead for more than 8 hours in any work day, the permissible exposure limit, as a time weighted average (TWA) for that day, shall be reduced according to the following formula: Maximum permissible limit (in ug/m3) = 400/hours worked in the day.

29CFR1910 Part 1025(d)(3)(i)

Lead - Exposure Monitoring - Basis of initial determination - The employer shall monitor employee exposures and shall base initial determinations on the employee exposure monitoring results and any of the following, relevant considerations:
(A) Any information, observations, or calculations which would indicate employee exposure to lead;
(B) Any previous measurements of airborne lead; and
(C) any employee complaints of symptoms which may be attributable to exposure to lead.

DOE5480.10 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.

DOE5480.10 Section 9.c(4)(c)

Engineering controls shall be the primary method used to minimize exposure to carcinogens and to prevent the release of carcinogens into the workroom environment. Provisions shall be made to assure that hazardous levels of contaminated air are not released into adjacent work areas or the outside environment. All contaminated liquid and solid waste shall be disposed utilizing approved methods (refer to DOE 5480.4, Attachment 1, paragraph 2.b.(11)).

19.3.2.1 Engineering Controls

29CFR1910 Part 25(d)(1)(i)

Care and Use of Ladders - Ladders shall be maintained in good condition at all times, the joint between the steps and side rails shall be tight, all hardware and fittings securely attached, and movable parts shall operate freely without binding or undue play.

29CFR1910 Part 25(d)(1)(ii)

Care and Use of Ladders - Metal bearings of locks, wheels, pulleys, etc., shall be frequently lubricated.

29CFR1910 Part 25(d)(1)(iii)

Care and Use of Ladders - Frayed or badly worn rope shall be replaced.

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 25(d)(1)(iv)

Care and Use of Ladders - Safety feet and other auxiliary equipment shall be kept in good condition to insure proper performance.

29CFR1910 Part 25(d)(1)(x)

Care and Use of Ladders - Ladders shall be inspected frequently and those which have developed defects shall be withdrawn from service for repair or destruction and tagged or marked as "Dangersoud, Do Not Use."

29CFR1910 Part 25(d)(1)(xi)

Care and Use of Ladders - Rungs should be kept free of grease and oil.

29CFR1910 Part 25(d)(2)(xiii)

Use - On two-section extencion ladders the minimum overlap for the two sections in sue shall be as follows:

Size of ladder (feet)	Overlap (feet)
Up to and including 36	3
Over 36 up to and including 48	4
Over 48 up to and including 60	5

29CFR1910 Part 25(d)(2)(xiv)

Use - Portable rung ladders with reinforced rails shall be used only with the matal reinforcement on the under side.

29CFR1910 Part 25(d)(2)(xv)

Use - No ladder should be used to gain access to a roof unless the top of the ladder shall extend at least 3 feet above the point of support. at eave, gutter, or roofline.

29CFR1910 Part 26(a)(2)(iii)

Portable Metal Ladders - Based on the nominal length of the ladder, each section of a multisection ladder shall overlap the adjacent section by at leas the number of feet stated in the following:

Normal length of ladder(feet)	Overlap (feet)
Up to and including 36	3
Over 36 up to and including 48	4
Over 48 up to and including 60	5

29CFR1910 Part 26(a)(2)(iv)

Portable Metal Ladders - Extension ladders shall be equipped with positive stops which will insure the overlap specified in the table above.

29CFR1910 Part 26(a)(3)(iii)

General Specifications - Stepladders - The length of a stepladder is measured by the length of the front rail. To be classified as a standard length ladder, the measured length shall be within plus or minus one-half inch of the specified length. Stepladders shall not exceed 20 feet in length.

29CFR1910 Part 26(a)(3)(vii)

General Specifications - Stepladders -The bottoms of the four rails are to be supplied with insulating nonslip material for the safety of the user.

29CFR1910 Part 27(a)(1)(i)

Fixed Ladders - The minimum design live load shall be a single concentrated load of 200 pounds.

29CFR1910 Part 27(a)(1)(iv)

Fixed Ladders - The weight of the ladder and attached appurtenances together with the live load shall be considered in the design of rails and fastenings.

29CFR1910 Part 27(b)(7)(i)

Fixed Ladders - Protection from deterioration: Metal ladders and appurtenances shall be painted or otherwise treated to resist corrosion and rusting when location demands. Ladders formed by individual metal rungs imbedded in concrete, which serve as access to pits and to other areas

under floors, are frequently located in an atmosphere that causes corrosion and rusting. To increase rung life in such atmosphere, individual metal rungs shall have a minimum diameter of 1 inch or shall be painted or otherwise treated to resist corrosion and rusting.

29CFR1910 Part 147(c)(5)(i)

Lockout and Tagout
(i) Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware shall be provided by the employer for isolating, securing or blocking of machines or equipment from energy sources.

29CFR1910 Part 147(c)(5)(ii)(A)

Lockout and Tagout
(ii) Lockout devices and target devices shall be singularly identified; shall be the only devices(s) used for controlling energy; shall not be used for other purposes; and shall meet the following requirements:
(A) Durable
(1) Lockout and tagout devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.
(2) Tagout devices shall be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.
(3) Tags shall not deteriorate when used in corrosive environments such as areas where acid an alkali chemicals are handled and stored.

29CFR1910 Part 147(c)(5)(ii)(B)

Lockout and Tagout
(B) Standardized. Lockout and tagout devices shall be standardized within the facility in at least one of the following criteria: color; shape; or size; and additionally, in the case of tagout devices, a print and format shall be standardized.

29CFR1910 Part 147(c)(5)(ii)(C)(1)

Lockout and Tagout
(C) Substantial-(1) Lockout devices. Lockout devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools.

29CFR1910 Part 147(c)(5)(ii)(C)(2)

Lockout and Tagout
(C) Substantial-(2) Tagout devices, including and their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.

29CFR1910 Part 151(c)

Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.

29CFR1910 Part 176(a)

Use of mechanical equipment. Where mechanical handling equipment is used, sufficient safe clearances shall be allowed for aisles, at loading docks, through doorways and wherever turns or passage must be made. Aisles and passageways shall be kept clear and in good repair, with no obstruction across or in aisles that could create a hazard. Permanent aisles and passageways shall be appropriately marked.

29CFR1910 Part 176(g)

Guarding. Covers and/or guardrails shall be provided to protect personnel from the hazards of open pits, tanks, vats, ditches, etc.

29CFR1910 Part 179(h)(1)(i)

Hoisting equipment. Sheaves. Sheave grooves shall be smooth and free from surface defects which could cause rope damage.

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 179(h)(1)(ii)

Sheaves. Sheaves carrying ropes which can be momentarily unloaded shall be provided with close-fitting guards or other suitable devices to guide the rope back into the groove when the load is applied again.

29CFR1910 Part 179(h)(1)(iii)

Sheaves. The sheaves in the bottom block shall be equipped with close-fitting guards that will prevent ropes from becoming fouled when the block is lying on the ground with ropes loose.

29CFR1910 Part 179(h)(1)(iv)

Sheaves. Pockets and flanges of sheaves used with hoist chains shall be of such dimensions that the chain does not catch or bind during operation.

29CFR1910 Part 179(h)(1)(v)

Sheaves. All running sheaves shall be equipped with means for lubrication. Permanently lubricated, sealed and/or shielded bearings meet this requirement.

29CFR1910 Part 179(h)(2)(i)

Ropes.
In using hoisting ropes, the crane manufacturer's recommendation shall be followed. The rated load divided by the number of parts of rope shall not exceed 20 percent of the nominal breaking strength of the rope.

29CFR1910 Part 179(h)(2)(ii)

Ropes. Socketing shall be done in the manner specified by the manufacturer of the assembly.

29CFR1910 Part 179(h)(2)(iii)

Ropes. Rope shall be secured to the drum as follows:
(a) No less than two wraps of rope shall remain on the drum when the hook is in its extreme low position.
(b) Rope end shall be anchored by a clamp securely attached to the drum, or by a socket arrangement approved by the crane or rope manufacturer.

29CFR1910 Part 179(h)(2)(v)

Ropes. Rope clips attached with U-bolts shall have the U-bolts on the dead or short end of the rope. Spacing and number of all types of clips shall be in accordance with the clip manufacturer's recommendation. Clips shall be drop-forged steel in all sizes manufactured commercially. When a newly installed rope has been in operation for an hour, all nuts on the clip bolts shall be retightened.

29CFR1910 Part 179(h)(2)(vi)

Ropes. Swaged or compressed fittings shall be applied as recommended by the rope or crane manufacturer.

29CFR1910 Part 179(h)(2)(vii)

Ropes. Wherever exposed to temperatures, at which fiber cores would be damaged, rope having an independent wirerope or wire-strand core, or other temperature-damage resistant core shall be used.

29CFR1910 Part 179(h)(2)(viii)

Ropes. Replacement rope shall be the same size, grade, and construction as the original rope furnished by the crane manufacturer, unless otherwise recommended by a wire rope manufacturer due to actual working condition requirements.

29CFR1910 Part 179(h)(3)

Equalizers. If a load is supported by more than one part of rope, the tension in the parts shall be equalized.

29CFR1910 Part 179(h)(4)

Hooks. Hooks shall meet the manufacturer's recommendations and shall not be overloaded.

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 179(i)

Warning device. Except for floor-operated cranes a gong or other effective warning signal shall be provided for each crane equipped with a power traveling mechanism.

29CFR1910 Part 305(j)(4)(ii)(A)

A disconnecting means shall be located in sight from the controller location. However, a single disconnecting means may be located adjacent to a group of coordinated controllers mounted adjacent to each other on a multi-motor continuous process machine. The controller disconnecting means for motor branch circuits over 600 volts, nominal, may be out of sight of the controller, if the controller is marked with a warning label giving the location and identification of the disconnecting means which is to be locked in the open position.

29CFR1910 Part 305(j)(4)(ii)(D)

The disconnecting means shall plainly indicate whether it is in the open (off) or closed (on) position.

29CFR1910 Part 333(c)(4)

Illumination

(i) Employees may not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely.

(ii) Where lack of illumination or an obstruction precludes observation of the work to be performed, employees may not perform tasks near exposed energized parts. Employees may not reach blindly into areas which may contain energized parts.

29CFR1910 Part 333(c)(10)

Selection and use of work practices
(10) Interlocks. Only a qualified person following the requirements of paragraph (c) of this section may defeat an electrical safety interlock, and then only temporarily while he or she is working on the equipment. The interlock system shall be returned to its operable condition when this work is completed.

29CFR1910 Part 1001(f)(1)(i)

Asbestos
(f) Methods of compliance - (1) Engineering controls and work practices. (i) The employer shall institute engineering controls and work practices to reduce and maintain employee exposure to or below the TWA and/or excursion limit, prescribed in paragraph (c) of this section, except to the extent that such controls are not feasible.

29CFR1910 Part 1001(f)(1)(ii)

Asbestos
(f) Methods of compliance.(1) Engineering controls and work practices (ii) Wherever the feasible engineering controls and work practices that can be instituted are not sufficient to reduce employee exposure to or below the TWA and/or excursion limit prescribed in paragraph (c) of this section, the employer shall use them to reduce employee exposure to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protection that complies with the requirements of paragraph (g) of this section.

29CFR1910 Part 1001(f)(1)(iii)

Asbestos
(f) Methods of compliance- (1) Engineering controls and work practices (iii) For the following operations, wherever feasible engineering controls and work practices that can be instituted are not sufficient to reduce the employee exposure to or below the TWA and/or excursion limit, prescribed in paragraph (c) of this section, the employer shall use them to reduce employee exposure to or below 0.5 fiber per cubic centimeter of air (as an eight-hour time-weighted average) or 2.5 fibers/cc for 30 minutes (short-term exposure) and shall supplement them by the use of any combination of respiratory protection that complies with the requirements of paragraph (g) of this section, work practices and feasible engineering controls that will reduce employee exposure to or below the TWA and to or below the excursion limit prescribed in paragraph (c) of this section: Coupling cutoff in primary asbestos cement pipe manufacturing; sanding in primary and secondary asbestos cement sheet manufacturing; grinding in primary and secondary friction product manufacturing; carding and spinning in dry textile processes; and grinding

and sanding in primary plastics manufacturing.

29CFR1910 Part 1001(f)(1)(iv)

Asbestos
(f) Methods of compliance -(1) Engineering controls and work practices (iv) Local exhaust ventilation. Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with good practices such as those found in the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2 1979.

29CFR1910 Part 1001(f)(1)(ix)

Asbestos
(f) Methods of compliance (1) Engineering controls and work practices (ix) Compressed air. Compressed air shall not be used to remove asbestos or materials containing asbestos, unless the compressed air is used in conjunction with a ventilation system designed to capture the dust cloud created by the compressed air.

29CFR1910 Part 1001(f)(1)(v)

Asbestos
(f) Methods of compliance - (1) Engineering controls and work practices (v) Particular tools. All hand-operated and power-operated tools with would produce or release fibers of asbestos so as to expose employees to levels in excess of the TWA and/or excursion limit prescribed in paragraph (c) of this section, such as, but not limited to saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems which comply with paragraph (f)(1)(iv) of this section.

29CFR1910 Part 1001(f)(1)(vi)

Asbestos
(f) Methods of compliance (1) Engineering controls and work practices (vi) Wet methods. Insofar as practicable, asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers so as to expose employees to levels in excess of the TWA and/or excursion limit, prescribed in paragraph (c) of this section, unless the usefulness of the product would be diminished thereby.

29CFR1910 Part 1001(f)(1)(viii)

Asbestos
(f) Methods of compliance (1) Engineering controls and work practices (viii) Particular products and operations. No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne fibers of asbestos so as to expose employees to levels in excess of the TWA and/or excursion limit prescribed in paragraph (c) of this section.

29CFR1910 Part 1001(i)(1)(i)

Asbestos/Hygiene facilities and practices
(1) Change rooms.
(i) The employer shall provide clean change rooms for employees who work in areas where their airborne exposure to asbestos is above the TWA and/or excursion limit.

29CFR1910 Part 1001(i)(1)(ii)

Asbestos
(i) Hygiene facilities and practices
(1) Change rooms
(ii) The employer shall ensure that change rooms are in accordance with 1910.141(e) of this part, and are equipped with two separate lockers or storage facilities, so separated as to prevent contamination of the employee's street clothes from his protective work clothing and equipment.

29CFR1910 Part 1001(i)(2)

Asbestos
(i) Hygiene facilities and practices (2) Showers. (i) The employer shall ensure that employees who work in areas where their airborne exposure is above the TWA and/or excursion limit shower at the end of the work shift. (ii) The employer shall provide shower facilities which comply with

19.0 OCCUPATIONAL SAFETY AND HEALTH

1910.141(d)(3) of this part. (iii) The employer shall ensure that employees who are required to shower pursuant to paragraph (i)(2)(i) of this section do not leave the workplace wearing any clothing or equipment worn during the work shift.

29CFR1910 Part 1001(i)(3)

Asbestos
(i) Hygiene facilities and practices (3) Lunchrooms. (i) The employer shall provide lunchroom facilities for employees who work in areas where their airborne exposure is above the TWA and/or excursion limit. (ii) The employer shall ensure that lunchroom facilities have a positive pressure, filtered air supply, and are readily accessible to employees. (iii) The employer shall ensure that employees who work in areas where their airborne exposure is above the TWA and/or excursion limit wash their hands and faces prior to eating, drinking or smoking. (iv) The employer shall ensure that employees do not enter lunchroom facilities with protective work clothing or equipment unless surface asbestos fibers have been removed from the clothing or equipment by vacuuming or other method that removes dust without causing the asbestos to become airborne.

19.3.2.2 Administrative Controls

29CFR1910 Part 95(d)

Monitoring.

(1) When information indicates that any employee's exposure may equal or exceed an 8-hour time-weighted average of 85 decibels, the employer shall develop and implement a monitoring program.

(i) The sampling strategy shall be designed to identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors.
(ii) Where circumstances such as high worker mobility, significant variations in sound level, or a significant component of impulse noise make area monitoring generally inappropriate, the employer shall use representative personal sampling to comply with the monitoring requirements of this paragraph unless the employer can show that area sampling produces equivalent results.

(2)

(i) All continuous, intermittent and impulsive sound levels from 80 decibels to 130 decibels shall be integrated into the noise measurements.
(ii) Instruments used to measure employee noise exposure shall be calibrated to ensure measurement accuracy.

(3) Monitoring shall be repeated whenever a change in production, process, equipment or control increases noise exposures to the extent that:

(i) Additional employees may be exposed at or above the action level; or
(ii) The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of paragraph (j) of this section.

29CFR1910 Part 141(d)

Washing facilities -

(1) General. Washing facilities shall be maintained in a sanitary condition.

(2) Lavatories.

(i) Lavatories shall be made available in all places of employment. The requirements of this subdivision do not apply to mobile crews or to normally unattended work locations if employees working at these locations have transportation readily available to nearby washing facilities which meet the other requirements of this paragraph.
(ii) Each lavatory shall be provided with hot and cold running water.
(iii) Handsoap or similar cleansing agents shall be provided.
(iv) Individual hand towels or sections thereof, of cloth or paper, warm air blowers or clean individual sections of continuous cloth toweling,

convenient to the lavatories, shall be provided.

(3) Showers

(i) Whenever showers are required by a particular standard, the showers shall be provided in accordance with paragraphs (d)(3)(ii) through (v) of this section.
(ii) One shower shall be provided for each 10 employees of each sex, or numerical fraction thereof, who are required to shower during the same shift.
(iii) Body soap or other appropriate cleansing agents convenient to the showers shall be provided as specified in paragraph (d)(2)(iii) of this section.
(iv) Showers shall be provided with hot and cold water feeding a common discharge line.
(v)Employees who use showers shall be provided with individual clean towels.

29CFR1910 Part 141(e)

Change rooms. Whenever employees are required by a particular standard to wear protective clothing because of the possibility of contamination with toxic materials, change rooms equipped with storage facilities for street clothes and separate storage facilities for the protective clothing shall be provided.

29CFR1910 Part 145 [R]

All employees shall be informed as to the meaning of various accident prevention signs and tags used throughout the workplace and what special precautions are necessary.

29CFR1910 Part 145(f)

(f) Accident prevention tags-(1) Scope and application.

(i) This paragraph (f) applies to all accident prevention tags used to identify hazardous conditions as set forth in paragraph (f)(3) of this section, or to meet the specific tagging requirements of other OSHA standards.

(ii) This paragraph (f) does not apply to construction, maritime or agriculture.

(2) Definitions. "Biological hazard" or "BIOHAZARD" means those infectious agents presenting a risk of death, injury or illness to employees. "Major message" means that portion of a tag's inscription that is more specific than the signal word and that indicates the specific hazardous condition or the instruction to be communicated to the employee. Examples include: "High Voltage," "Close Clearance," "Do Not Start," or "Do Not Use" or a corresponding pictograph used with a written text or alone. "Pictograph" means a pictorial representation used to identify a hazardous condition or to convey a safety instruction. "Tag" means a device usually made of card, paper, pasteboard, plastic or other material used to identify a hazardous condition.

(3) Use. Tags shall be used as a means to prevent accidental injury or llness to employees who are exposed to hazardous or potentially hazardous conditions, equipment or operations which are out of the ordinary, unexpected or not readily apparent. Tags shall be used until such time as the identified hazard is eliminated or the hazardous operation is completed. Tags need not be used where signs, guarding or other positive means of protection are being used.

(4) General Tag Criteria. All required tags shall meet the following criteria:

(i) Tags shall contain a signal word and a major message.

(A) The signal word shall be either "Danger," "Caution," or "Biological Hazard," "BIOHAZARD," or the biological hazard symbol.
(B) The major message shall indicate the specific hazardous condition or the instruction to be communicated to the employee.

(ii) The signal word shall be readable at a minimum distance of five feet (1.52m) or such greater distance as warranted by the hazard.

19.0 OCCUPATIONAL SAFETY AND HEALTH

(iii) The tag's major message shall be presented in either pictographs, written text or both.

(iv) The signal word and the major message shall be understandable to all employees who may be exposed to the identified hazard.

(v) All employees shall be informed as to the meaning of the various tags used throughout the workplace and what special precautions are necessary.

(vi) Tags shall be affixed as close as safely possible to their respective hazards by a positive means such as, string, wire, or adhesive that prevents their loss or unintentional removal.

(5) Danger tags. Danger tags shall be used in major hazard situations where an immediate hazard presents a threat of death or serious injury to employees. Danger tags shall be used only in these situations.

(6) Caution tags. Caution Tags shall be used in minor hazard situations
where a non-immediate or potential hazard or unsafe practice presents a lesser threat of employee injury. Caution tags shall be used only in these situations.

(7) Warning tags. Warning tags may be used to represent a hazard level between "Caution" and "Danger," instead of the required "Caution" tag, provided that they have a signal word of "Warning," an appropriate major
message, and otherwise meet the general tag criteria of paragraph (f)(4) of this section.

(8) Biological hazard tags.

(i) Biological hazard tags shall be used to identify the actual or potential presence of a biological hazard and to identify equipment, containers, rooms, experimental animals, or combinations thereof, that contain or are contaminated with hazardous biological agents.

(ii) The symbol design for biological hazard tags shall conform to the design shown below:

(9) Other tags. Other tags may be used in addition to those required by this paragraph (f), or in other situations where this paragraph (f) does not require tags, provided that they do not detract from the impact or visibility of the signal word and major message of any required tag.

29CFR1910 Part 145(f)(4)(vi)

Tags shall be affixed as close as safely possible to their respective hazards by a positive means such as, string, wire, or adhesive that prevents their loss or unintentional removal.

29CFR1910 Part 146(d)(10)

Develop and implement a system for the preparation, issuance, use, and cancellation of entry permits as required by this section;

29CFR1910 Part 146(d)(12)

Develop and implement procedures (such as closing off a permit space and canceling the entry after entry operations have been completed;

29CFR1910 Part 146(d)(13)

Review entry operations when the employer has reason to believe that the measures taken under the permit space program may not protect employees and revise the program to correct deficiencies found to exist before subsequent entries are authorized; and
Note: Examples of circumstances requiring the review of the permit space program are; any unauthorized entry of a permit space, the detection of a permit space hazard not covered by the permit, the detection of a condition prohibited by the permit, the occurrence of an injury or near miss during entry, a change in the use or configuration of a permit space, and employee complaints about the effectiveness of the program.

29CFR1910 Part 146(d)(14)

Review the permit space program, using the canceled permits retained under paragraph (e)(6) of this section within 1 year after each entry and revise the program as necessary, to ensure that employees participating in entry operations are protected from permit space hazards.

19.0 OCCUPATIONAL SAFETY AND HEALTH

Note: Employers may perform a single annual review covering all entries performed during a 12-month period. If no entry is performed during a 12-month period, no review is necessary.

29CFR1910 Part 146(e)(6)

The employer shall retain each canceled entry permit for at least 1 year to facilitate the review of the permit confined space program required by paragraph (d)(4) of this section. Any problems encountered during an entry operation shall be noted on the pertinent permit, so that appropriate revisions to the permit space program can be made.

29CFR1910 Part 147(c)(1)

Lockout and Tagout
(c) General-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.

29CFR1910 Part 147(c)(2)(i)

Lockout and Tagout
(c) General-2 Lockout/tagout. (i). If an energy isolating device is not capable of being locked out, the employer's energy control program under paragraph (c)(1) of this section shall utilized a tagout system.

29CFR1910 Part 147(c)(2)(iii)

Lockout and Tagout
(c) General
(2) Lockout/tagout.

(iii). After January 2, 1990, whenever replacement or major repair, renovation or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machine or equipment shall be designed to accept a lockout device.

29CFR1910 Part 147(c)(3)(i)

Lockout and Tagout
(c) (3) Full employee Protection. (i) When a tagout device is used on an energy isolating device which is capable of being locked out, the tagout device shall be attached at the same location that the lockout device would have been attached, and the employer shall demonstrate that the tagout program will provide a level of safety equivalent to that obtained by using a lockout program.

29CFR1910 Part 147(c)(3)(ii)

Lockout and Tagout
(c)(3)(ii) In demonstrating that a level of safety is achieved in the tagout program which is equivalent to the level of safety obtained by using a lockout program, the employer shall demonstrate lull compliance with all tagout related provisions of this standard together with such additional elements as are necessary to provide the equivalent safety available from the use of a lockout device. Additional means to be considered as part of the demonstration of full employee protection shall include the implementation of additional safety measures such as the removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, or the removal of a valve handle to reduce the likelihood of inadvertent energization.

29CFR1910 Part 147(c)(4)(i)

Procedures shall be developed, documented and utilized for the control of potentially hazardous energy when employees are engaged in the activities covered by this section.

Note: Exception: The employer need not document the required procedure for a particular machine or equipment, when all the following elements exist:

(1) the machine or equipment has no potential for stored or residual energy or reaccumulation of stored energy after shut down which could

19.0 OCCUPATIONAL SAFETY AND HEALTH

endanger employees:
(2) the machine or equipment has a single energy source which can be readily identified and isolated:
(3) the isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment;
(4) the machine or equipment is isolated from that energy source and locked out during servicing or maintenance;
(5) a single lockout device will achieve a locked-out condition;
(6) the lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance:
(7) the servicing or maintenance does not create hazards for other employees; and
(8) the employer, in utilizing this exception has not had accidents involving the unexpected activation or reenergization of the machine or equipment during servicing or maintenance.

29CFR1910 Part 147(c)(4)(ii)

Lockout and Tagout
(ii) The procedures shall clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be utilized for the control of hazardous energy, and the means to enforce compliance including, but not limited to, the following:

(A) A specific statement of the intended use of the procedure;
(B) Specific procedural steps for the shutting down, isolating, blocking and securing machines or equipment to control hazardous energy;
(C) Specific procedural steps for the placement, removal and transfer of lockout devices or tagout devices and the responsibility for them; and
(D) Specific requirements for testing a machine or equipment to determine and verify the effectiveness of lockout devices, tagout devices, and other energy control measures.

29CFR1910 Part 147(c)(5)(i)

Lockout and Tagout
(i) Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware shall be provided by the employer for isolating, securing or blocking of machines or equipment from energy sources.

29CFR1910 Part 147(c)(5)(iii)

Tagout devices shall warn against hazardous conditions if the machine or equipment is energized and shall include a legend such as the following: Do Not Start, Do Not Open, Do Not Close, Do Not Energize, Do Not Operate.

29CFR1910 Part 147(c)(8)

Energy isolation. Lockout or tagout shall be performed only by the authorized employees who are performing the servicing or maintenance.

29CFR1910 Part 147(c)(9)

Notification of employees. Affected employees shall be notified by the employer or authorized employee of the application and removal of lockout devices or tagout devices. Notification shall be given before the controls are applied, and after they are removed from the machine or equipment.

29CFR1910 Part 147(d)(1)

Preparation for shutdown. Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

29CFR1910 Part 147(d)(2)

Lockout and Tagout
(2) Machine or equipment shutdown. The machine or equipment shall be turned off or shut down using the procedures established for the machine or equipment. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of the equipment stoppage.

29CFR1910 Part 147(d)(3)

Lockout and Tagout
(3) Machine or equipment isolation. All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 147(d)(4)

Lockout and Tagout

(i) Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees.

(ii) Lockout devices, where used, shall be affixed in a manner to that will hold the energy isolating devices in a "safe" or "off" position

(iii) Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited.

(A) Where tagout devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.

(B) Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

29CFR1910 Part 147(d)(5)

Lockout and Tagout

(5) Stored energy.

(i) Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and other wise rendered safe.

(ii) If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

29CFR1910 Part 147(d)(6)

Lockout and Tagout

(6) Verification of isolation. Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and deenergization of the machine or equipment have been accomplished.

29CFR1910 Part 147(e)(1)

Lockout and Tagout

(e) Release from lockout or tagout. Before lockout or tagout devices are removed and energy is restored to the machine or equipment, procedures shall be followed and actions taken by the authorized employee(s) to ensure the following: (1) The machine or equipment. The work area shall be inspected to ensure that nonessential items have been removed and to ensure that machines or equipment components are operationally intact.

29CFR1910 Part 147(e)(2)

Lockout and Tagout

(e)(2) Employees.

(i) The work area shall be checked to ensure that all employees have been safely positioned or removed.

(ii) After lockout or tagout devices have been removed and before a machine equipment is started, affected employees shall be notified that the lockout or tagout device(s) have been removed.

29CFR1910 Part 147(e)(3)

Lockout and Tagout

(e)(3) Lockout or tagout devices removal. Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied the device. Exception to paragraph (e)(3): When the authorized employee who applied the lockout or tagout device is not available to remove it, that device is not available to remove it, that device may be removed under the direction of the employer, provided that specific procedures and training for such removal have been developed, documented and incorporated into the employer's energy control program. The employer shall demonstrate that the specific procedure provides equivalent safety to the removal of the device by the authorized employee who applied it. The specific procedure shall include at least the following elements: (i) Verification by the employer that the authorized employee who applied the device is not at the facility;

(ii) Making all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and

(iii) Ensuring that the authorized employee has this knowledge before he/she resumes work at that facility.

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 147(f)(2)

Lockout and Tagout
(f) Additional requirements
(2) Outside personnel (contractors, etc)
(i) Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this standard, the on-site employer and the outside employer shall inform each other of their respective lockout or tagout procedures.
(ii) The on-site employer shall ensure that his/her employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program.

29CFR1910 Part 147(f)(3)

Lockout and Tagout
(f) Group lockout or tagout.
(i) When servicing and/or maintenance is performed by a crew, craft, department or other group, they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.
(ii) Group lockout or tagout devices shall be used in accordance with procedures required by paragraph (c)(4) of this section including, but not necessarily limited to, the following specific requirements:
(A) Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group lockout or tagout device (such as operations lock);
(B) Provision for the authorized employee to ascertain the exposure stratus of individual group members with regard to the lockout or tagout of the machine or equipment and
(C) When more than one crew, craft, department, etc. is involved, assignment of overall job-associated lockout or tagout control responsibility to an authorized employee designated to coordinate affected work forces and ensure continuity of protection; and
(D) Each authorized employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work, and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

29CFR1910 Part 147(f)(4)

Shift or personnel changes. Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection, including provision for the orderly transfer of lockout or tagout device protection between offgoing and oncoming employees, to minimize exposure to hazards from the unexpected energization or startup of the machine or equipment, or the release of stored energy.

29CFR1910 Part 333(a)

Selection and use of work practices
(a) General. Safety-related work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, when work is performed near or on equipment or circuits which are or may be energized. The specific safety-related work practices shall be consistent with the nature and extent of the associated electrical hazards.

29CFR1910 Part 333(a)(1)

Selection and use of work practices
(a)(1) Deenergized parts. Live parts to which an employee may be exposed shall be deenergized before the employee works on or near them, unless the employer can demonstrate that deenergizing introduces additional or increased hazards or is infeasible due to equipment design or operational limitations. Live parts that operate at less than 50 volts to ground need not be deenergized if there will be no increased exposure due to electrical arcs. Note 1: Examples of increased or additional hazards include interruption of life support equipment, deactivation of emergency alarm systems, shutdown of hazardous location ventilation equipment, or removal of illumination of an area. Note 2: Examples of work that may be performed on or near energized circuit parts because of infeasibility due to equipment redesign or operational limitation include testing of electric circuits that can only be performed with the circuit energized and work on circuits that form an integral part of a continuous industrial processing a chemical plant that would otherwise need to be completely shut down in order to permit work on one circuit or piece of equipment. Note 3: Work on or near deenergized parts is covered by paragraph (b) of this section.

29CFR1910 Part 333(a)(2)

Selection and use of work practices

19.0 OCCUPATIONAL SAFETY AND HEALTH

(a)(2) Energized parts. If the exposed live parts are not deenergized (i.e., for reasons of increased or additional hazards or infeasibility), other safety-related work practices shall be used to protect employees who may be exposed to the electrical hazards involved. Such work practices shall protect employees against contact with energized circuit parts directly with any part of their body or indirectly through some other conductive object. The work practices that are used shall be suitable for the conditions under which the work is to be performed and for the voltage level of the exposed electric conductors or circuit parts. Specific work practice requirements are detailed in paragraph (c) of this section.

29CFR1910 Part 333(b)(1)

Selection and use of work practices
(b) (1)Working on or near exposed deenergized parts. (1) Application. This paragraph applies to work on exposed deenergized parts or near enough to them to expose the employee to any electrical hazard they present. Conductors and parts of electric equipment that have been deenergized but have not been locked out or tagged in accordance with paragraph (b) of this section shall be treated as energized parts, and paragraph (c) of this section applied to work on or near them.

29CFR1910 Part 333(b)(2)(iii)

Application of locks and tags.

(A) A lock and a tag shall be placed on each disconnecting means used to deenergize circuits and equipment on which work is to be performed, except as provided in paragraphs (b)(2)(iii)(C) and (b)(2)(iii)(E) of this section. The lock shall be attached so as to prevent persons from operating the disconnecting means unless they resort to undue force or the use of tools.

(B) Each tag shall contain a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag.

(C) If a lock cannot be applied, or if the employer can demonstrate rate that tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock, a tag may be used without a lock.

(D) A tag used without a lock, as permitted by paragraph (b)(2)(iii)(C) of this section, shall be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock. Examples of additional safety measures include the removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device.

(E) A lock may be placed without a tag only under the following conditions:

(1) Only one circuit or piece of equipment is deenergized, and

(2) The lockout period does not extend beyond the work shift, and

(3) Employees exposed to the hazards associated with reenergizing the circuit or equipment are familiar with this procedure.

29CFR1910 Part 333(b)(2)(iv)

Verification of deenergized condition. The requirements of this paragraph shall be met before any circuits or equipment can be considered and worked as deenergized.

(A) A qualified person shall operate the equipment operating controls or otherwise verify that the equipment cannot be restarted.

(B) A qualified person shall use test equipment to test the circuit element and electrical parts of equipment to which employees will be exposed and shall verify that the circuit elements and equipment parts are deenergized. The test shall also determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage back feed even though specific parts of the circuit have been deenergized and presumed to be safe. If the circuit to be tested is over 600 volts, nominal, the test equipment shall be checked for proper operation immediately before and immediately after this test.

29CFR1910 Part 333(b)(2)(v)

Reenergizing equipment. These requirements shall be met, in the order given, before circuits or equipment are reenergized, even temporarily.

19.0 OCCUPATIONAL SAFETY AND HEALTH

(A) A qualified person shall conduct tests and visual inspection, as necessary, to verify that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed, so that the circuits and equipment can be safely energized.

(B) Employees exposed to the hazards associated with reenergizing the circuit or equipment shall be warned to stay clear of circuits and equipment.

(C) Each lock and tag shall be removed by the employee who applied it or under his or her direct supervision. However, if this employee is absent from the workplace, then the lock or tag may be removed by a qualified person designated to perform this task. Provided that:

(1) The employer ensures that the employee who applied the lock or tag is not available at the workplace, and

(2) The employer ensures that the employee is aware that the lock or tag has been removed before he or she resumes work at that workplace.

(D) There shall be a visual determination that all employees are clear of the circuits and equipment.

29CFR1910 Part 333(c)(1)

Application. This paragraph applies to work performed on exposed live parts (involving either direct contact or contact by means of tools or materials) or near enough to them for employees to be exposed to any hazard they present.

29CFR1910 Part 333(c)(2)

Work on energized equipment. Only qualified persons may work on electric circuit parts or equipment that have not been deenergized under the procedures of paragraph (b) of this section. Such persons shall be capable of working safely on energized circuits and shall be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, land insulated tools.

29CFR1910 Part 333(c)(3)

Overhead lines. If work is to be performed near overhead lines, the lines shall be deenergized and grounded, or other protective measures shall be provided before work is started. If the lines are to be deenergized, arrangements shall be made with the person or organization that operates or controls the electric circuits involved to deenergize and ground them. If protective measures, such as guarding, isolating, or insulating are provided, these precautions shall prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

Note: The work practices used by qualified persons installing insulating devices on overhead power transmission or distribution lines are not covered by 1910.332 through 1910.335. Under paragraph (c)(2) of this section, unqualified persons are prohibited from performing this type of work.

29CFR1910 Part 333(c)(3)(i)

Unqualified persons.

(A) When an unqualified person is working in an elevated position near overhead lines, the location shall be such that the person and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the following distances:

(1) For voltages to ground 50 kV or below-10ft. (305cm);

(2) For voltages to ground over 50 kV-10 ft.(305cm) plus 4 in.(10cm) for every 10kV over 50kV.

(B) When an unqualified person is working on the ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded, energized overhead lines that the distances given in paragraph (c)(3)(i)(A) of this section.

Note: For voltages normally encountered with overhead power lines, objects which do not have an insulating rating for the voltage involved are considered to be conductive.

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 333(c)(3)(ii)

Qualified persons. When a qualified person is working in the vicinity of overhead lines, whether in an elevated position or on the ground, the person may not approach or take any conductive object without an approved insulating handle closer to exposed energized parts than shown in Table S-5 unless:

(A) The energized part (gloves with sleeves if necessary, rated for the voltage involved are considered to be insulation of the person from the energized part on which work is performed), or

(B) The energized part is insulated both from all other conductive objects at a different potential and from the person, or

(C) The person is insulated from all conductive objects at a potential different from that of the energized part.

29CFR1910 Part 333(c)(5)

Confined spaces or enclosed work spaces. When an employee works in a confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, the employer shall provide, and the employee shall use, protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with these parts. Doors, hinged panels, and the like shall be secured to prevent their swinging into an employee and causing the employee to contact exposed energized parts.

29CFR1910 Part 333(c)(6)

Conductive materials and equipment. Conductive materials and equipment that are in contact with any part of an employee's body shall be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts. If an employee must handle long dimensional conductive objects (such as ducts and pipes) in areas with exposed live parts, the employer shall institute work practices (such as the use of insulation, guarding, and material handling techniques) which will minimize the hazard.

29CFR1910 Part 333(c)(7)

Portable ladders. Portable ladders shall have nonconductive side rails if they are used where the employee or the ladder could contact exposed energized parts.

29CFR1910 Part 333(c)(8)

Conductive apparel. Conductive articles of jewelry and clothing (such as watch bands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear) may not be worn if they might contact exposed energized parts. However, such articles may be worn if they are rendered nonconductive by covering, wrapping, or other insulating means.

29CFR1910 Part 333(c)(9)

Housekeeping duties. Where live parts present an electrical contact hazard, employees may not perform housekeeping duties at such close distances to the parts that there is as possibility of contact, unless adequate safeguards (such as insulating equipment or barriers) are provided. Electrically conductive solids such as steel wool, metalized cloth, and silicon carbide, as well as conductive liquid solutions) may not be used in proximity to energized parts unless procedures are followed which will prevent electrical contact.

29CFR1910 Part 333(c)(10)

Selection and use of work practices
(10) Interlocks. Only a qualified person following the requirements of paragraph (c) of this section may defeat an electrical safety interlock, and then only temporarily while he or she is working on the equipment. The interlock system shall be returned to its operable condition when this work is completed.

29CFR1910 Part 1001(c)(1)

Asbestos
(c) Permissible exposure limits (PELS) - (1) Time-weighted average limit (TWA). The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.2 fiber per cubic centimeter of air as an eight (8)-hour time-weighted average (TWA) as determined by the method prescribed in Appendix A of this section, or by an equivalent method.

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 1001(i)(4)

Asbestos
(i) Hygiene facilities and practices (4) Smoking in work areas. The employer shall ensure that employees do not smoke in work areas where they are occupationally exposed to asbestos because of activities in that work area.

29CFR1910 Part 1001(j)(1)

Warning signs.

(i) Posting. Warning signs shall be provided and displayed at each regulated area. In addition, warning signs shall be posted at all approaches to regulated areas so that an employee may read the signs and take necessary protective steps before entering the area.

(ii) Sign specifications. The warning signs required by paragraph (j)(1)(i) of this section shall bear the following information:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

(iii) [Reserved]

(iv) The employer shall ensure that employees working in and contiguous to regulated areas comprehend the warning signs required to be posted by paragraph (j)(1)(i) of this section. Means to ensure employee comprehension may include the use of foreign languages, pictographs and graphics.

29CFR1910 Part 1001(j)(2)

Warning labels.

(i) Labeling. Warning labels shall be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, or to their containers.

(ii) Label specifications. The labels shall comply with the requirements of 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard, and shall include the following information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

29CFR1910 Part 1001(k)

Asbestos
(k) Housekeeping. (1) All surfaces shall be maintained as free as practicable of accumulations of dusts and waste containing asbestos. (2) All spills and sudden releases of material containing asbestos shall be cleaned up as soon as possible. (3) Surfaces contaminated with asbestos may not be cleaned by the use of compressed air. (4) Vacuuming. HEPA-filtered vacuuming equipment shall be used for vacuuming. The equipment shall be used and emptied in a manner which minimizes the reentry of asbestos into the workplace. (5) Shoveling, dry sweeping and dry clean-up of asbestos may be used only where vacuuming and/or wet cleaning are not feasible. (6) Waste disposal. Waste, scrap, debris, bags, containers, equipment, and clothing contaminated with asbestos consigned for disposal, shall be collected and disposed of in sealed impermeable bags, or other closed, impermeable containers.

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 1001(n)(1)

Asbestos
(n) Observation of monitoring (1) Employee observation. The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to asbestos conducted in accordance with paragraph (d) of this section.

29CFR1910 Part 1200(e)(1)

Hazard Communication
(e) Written hazard communication program. (1) Employers shall develop, implement, and maintain at the workplace, a written hazard communication program for their workplaces which at least describes how the criteria specified in paragraphs (f), (g), and (h) of this section for labels and other forms of warning, material safety data sheets, and employee information and training will be met, and which also includes the following: (i) A list of the hazardous chemicals known to be present using an identity that is referenced on the appropriate material safety data sheet (the list may be compiled for the workplace as a whole or for individual work areas); and, (ii) The methods the employer will use to inform employees of the hazards of non-routine tasks (for example, the cleaning of reactor vessels), and the hazards associated with chemicals contained in unlabeled pipes in their work areas.

29CFR1910 Part 1200(e)(2)

Hazard Communication
(e) Written hazard communication program. (2) Multi-employer workplaces. Employers who produce, use, or store hazardous chemicals at a workplace in such a way that the employees of other employer(s) may be exposed (for example, employees of a construction contractor working on-site) shall additionally ensure that the hazard communication programs developed and implemented under this paragraph (e) include the following: (i) The methods the employer will use to provide the other employer(s) with a copy of the material safety data sheet, or to make it available at a central location in the workplace, for each hazardous chemical the other employer(s)' employees may be exposed to while working; (ii) The methods the employer will use to inform the other employer(s) of any precautionary measures that need to be taken to protect employees during the workplace's normal operating conditions and in foreseeable emergencies; and, (iii) The methods the employer will use to inform the other employer(s) of the labeling system used in the workplace.

29CFR1910 Part 1200(e)(3)

Hazard Communication
(e) Written hazard communication program (3) The employer may rely on an existing hazard communication program to comply with these requirements, provided that it meets the criteria established in this paragraph (e).

29CFR1910 Part 1200(f)(1)

Hazard Communication
(f) Labels and other forms of warning. (1) The chemical manufacturer, importer, or distributor shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged or marked with the following information: (i) Identity of the hazardous chemical(s); (ii) Appropriate hazard warnings; and (iii) Name and address of the chemical manufacturer, importer, or other responsible party.

29CFR1910 Part 1200(g)(1)

Hazard Communication
(g) Material safety data sheets. (1) Chemical manufacturers and importers shall obtain or develop a material safety data sheet for each hazardous chemical they produce or import. Employers shall have a material safety data sheet for each hazardous chemical which they use.

29CFR1910 Part 1200(g)(8)

Hazard Communication
(g) Material safety data sheets. (8) The employer shall maintain copies of the required material safety data sheets for each hazardous chemical in the workplace, and shall ensure that they are readily accessible during each work shift to employees when they are in their work area(s).

29CFR1910 Part 1200(g)(9)

Hazard Communication
(g) Material safety data sheets. (9) Where employees must travel between workplaces during a workshift, i.e., their work is carried out at more than one geographical location, the material safety data sheets may be kept at a central location at the primary workplace facility. In this situation,

the employer shall ensure that employees can immediately obtain the required information in an emergency.

29CFR1910 Part 1200(g)(10)

Hazard Communication
(g) Material safety data sheets. (10) Material safety data sheets may be kept in any form, including operating procedures, and may be designed to cover groups of hazardous chemicals in a work area where it may be more appropriate to address the hazards of a process rather than individual hazardous chemicals. However, the employer shall ensure that in all cases the required information is provided for each hazardous chemical, and is readily accessible during each work shift to employees when they are in their work areas(s).

29CFR1910 Part 1200(g)(11)

Hazard Communication
(g) Material safety data sheets. (11) Material safety data sheets shall also be made readily available, upon request, to designated representatives and to the Assistant Secretary, in accordance with the requirements of 29CFR1910.20 (e). The Director shall also be given access to material safety data sheets in the same manner.

DOE5480.10 Section 9.c(4)(b)

Regulated areas shall be established where chemical carcinogens are used. The characteristics of regulated areas shall be appropriate to assure that accessis 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.

DOE5480.10 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.

DOE5480.19 Attachment I, Chapter IV, Section C.6

Oral instructions should be clear and concise. In all communications, the sender and intended receiver should be readily identifiable. Instructions involving the operation of equipment should be repeated by the receiver to the extent necessary for the sender to ensure the instructions are correctly understood.

DOE5480.19 Attachment I, Chapter IX, Section C.1

Lockout/Tagout Use
Locks and Tags should be placed on controls when for safety or other special administrative reasons controls must be established. Lockout is the application of a lock on a control to render the control inoperative. Locks may be built into the switch or be external locks (e.g. padlocks) that may be affixed and or removed when necessary. Keys and/or combinations for Locks are controlled. Other devices (such as wiring a control inoperable, placing control defeating devices, etc.) may also constitute a lesser degree of Lockout. Tagout is the application of a danger or warning device on the control, which indicates that the control is not to be used except under conditions indicated by the tag. Tags should be placed on the control that is tagged out, or as close as possible to indicate clearly the condition.

DOE5480.19 Attachment I, Chapter IX, Section C.2.d.(1)

A list of components that are required to be locked should be established and approved by the operations supervisor or appropriate manager. The list should be separate from the standard alignment checklists.

DOE5480.19 Attachment I, Chapter IX, Section C.2.d.(2)

Criteria for locking of additional components and necessary authorizations should be provided.

DOE5480.19 Attachment I, Chapter IX, Section C.2.d.(3)

When key operated locks are used, access to the keys should be restricted to authorized personnel. Keys should be readily available to appropriate personnel.

DOE5480.19 Attachment I, Chapter IX, Section C.2.d.(4)

Specific techniques for verifying the position of locked components should be established. A hands-on physical check of critical equipment or the

observation of a reliable position indicator should be used whenever possible.

DOE5480.19 Attachment I, Chapter IX, Section C.2.d.(5)

When locked components must be unlocked or placed in a position other than the normal locked position, the deviation should be authorized and documented.

DOE5480.19 Attachment I, Chapter IX, Section C.2.d.(6)

Periodic checks of locked components should be performed to ensure that locking devices are properly attached and that the component is in the required position.

DOE5480.19 Attachment I, Chapter IX, Section C.4

Lockout/Tagout Program
A Lockout/Tagout program should be established consisting of procedures to control potentially hazardous energy and materials and personnel training. This program should ensure that potentially hazardous energy or toxic material sources are isolated and rendered inoperative during servicing or maintenance or in any case where unexpected energizing, startup, or release of stored energy or toxic material can cause injury.

DOE5480.19 Attachment I, Chapter IX, Section C.5

Procedures for Lockout/Tagout
Procedures should be developed, documented, validated, and utilized for control of potentially hazardous energy or material. Procedures should clearly and specifically state the scope, purpose, authorization, rules, and techniques of the Lockout/Tagout program.

a. Procedures should include, but not be limited to, the following:

(1) Specific statement of intent of use;

(2) Specific procedural steps for isolating, blocking and securing machine or equipment for hazardous energy or material;

(3) Specific procedural steps for the placement, removal, and transfer of the Lockout/Tagout device(s); and

(4) Specific requirements to test machines and to determine and verify the effectiveness of Lockout, Tagout or other control measures.

b. It is not necessary to document the required procedure for a particular machine or equipment, when all of the following elements exist.

(1) The machine or equipment has no potential for stored or residual energy or reaccumulation of stored energy after shutdown which could endanger personnel.

(2) The machine or equipment has a single energy source which can be readily identified and isolated.

(3) The isolation and locking out of that energy source will completely de-energize and de-activate the machine or equipment.

(4) The machine or equipment is isolated from that energy source and locked out during servicing or maintenance.

(5) A single lockout device will achieve a locked out condition.

(6) The lockout device is under the exclusive control of the authorized personnel performing servicing of maintenance.

(7) The servicing or maintenance does not create hazards to other personnel.

(8) The employer, in utilizing the exception, has had no accidents involving the unexpected activation or reenergization of the machine or equipment during servicing or maintenance.

19.0 OCCUPATIONAL SAFETY AND HEALTH

c. Documentation of Lockout/Tagout

Lockout/Tagout placement, activation and removal should be recorded including any information relevant to their occurrence. This record should be maintained by the shift supervisor or appropriate manager to ensure accuracy and completeness. The Lockout/Tagout record should be reviewed periodically by operations and maintenance personnel as guidance.

DOE5480.19 Attachment I, Chapter IX, Section C.9.a

Caution Tags. C.9. Caution tags should not be used for personnel protection (i.e., caution tags should not be used where it is appropriate to use a Lockout or Tagout devise). Administration of caution tags could however, be accomplished as part of the Lockout/Tagout program or it could be covered separately. The use of caution tags should be restricted to those situation in which a component or system is functional, but when some precaution or item(s) of information is necessary prior to operation. In addition, the program should include the following elements:

a. Caution tags should be uniquely identifiable and different in appearance from other station tags. The following information should be included on the tags as an aid in administering the program:

(1) caution tag number
(2) component name and number;
(3) effective date;
(4) precaution or information applicable to the particular situation and/or component or system; and
(5) signature of authorizing individual and organization.

DOE5480.19 Attachment I, Chapter IX, Section C.9.b

Caution Tags.
Situations that require special operator or maintenance precautions or amplifying information should be brought to the attention of the shift supervisor or appropriate manager. The supervisor or manager should ensure that issuing a caution tag is necessary and that the tag is not being used in place of more appropriate administrative action (such as a temporary procedure change, placing an operator aide, use of the work control system, or issuance of a safety Lockout or Tagout). The supervisor review should also ensure that any instruction contained in the caution tag does not deviate from established facility procedures, technical specifications, or OSR's.

DOE5480.19 Attachment I, Chapter IX, Section C.9.c

A record of all active caution tags and associated amplifying information should be available to the appropriate personnel. This record and associated tags should be reviewed periodically by qualified personnel. This review should verify the continued need and applicability for each caution tag and ensure that the caution tag index accurately reflects all active caution tags. This review should be documented. Any caution tags remaining in an active status for extended periods (e.g., longer than three months, as appropriate) should be brought to the attention of the operations supervisor or manager. The operations supervisor or manager should determine what action is needed to resolve the continued use of the caution tag.

DOE5483.1A Chapter I, Section 1 & 2

1. 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 20 CFR Part 1015.
d. "Safety and Health Regulation for Longshoring," Title 29 CFR Part 1918.
e. "Occupational Safety and Health Standards for Agriculture," Title 20 CFR Part 1920.
2. STANDARDS FILE. Each contractor shall assure that current copies of DOE-prescribed OSHA standards cited in paragraph 1, above, along with the contractor's own safety and health procedures applicable to the workplace, are available in a place and form reasonably accessible to all employees and their authorized representatives.

DOE5483.1A Chapter I, Section 5.a.(1)

All contractor employees shall be instructed by the contractor to:

19.0 OCCUPATIONAL SAFETY AND HEALTH

(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.

19.3.2.3 Personal Protective Equipment

29CFR1910 Part 132(a)

Personal Protective Equipment-General Requirements
Application. Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used and maintained in a sanitary and reliable condition whenever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

29CFR1910 Part 132(e)

Defective and damaged equipment. Defective or damaged personal protective equipment shall not be used.

29CFR1910 Part 133(b)(1), Sentence 1

Protective eye and face devices purchased after July 5, 1994 shall comply with ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection," which is incorporated by reference, or shall be demonstrated by the employer to be equally effective.

29CFR1910 Part 134(a)(1)

In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to the following requirements.

29CFR1910 Part 134(a)(2)

Respiratory Protection Program
(a) Permissible practice.

(2) Respirators shall be provided by the employer when such equipment is necessary to protect the health of the employee. The employers shall provide the respirators which are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of a respiratory protective program which shall include the requirements outlined in paragraph (b) of this section.

29CFR1910 Part 134(a)(3)

Respiratory Protection Program
(a) Permissible practice.
(3) The employee shall use the provided respiratory protection in accordance with instructions and training received.

29CFR1910 Part 134(a)(7), Last Sentence

Respiratory protection. Permissible practice. Respirators for emergency use such as self-contained devices shall be thoroughly inspected at least once a month and after each use.

29CFR1910 Part 134(c)

Selection of respirators. Proper selection of respirators shall be made according to the guidance of American National Standard Practices for Respiratory Protection Z88.2-1969.

29CFR1910 Part 134(d)(1)

Air quality.
Compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration shall be of high purity. Oxygen shall meet the requirements of the United States Pharmacopoeia for medical or breathing oxygen. Breathing air shall meet at least the requirements of the

specification for Grade D breathing air as described in Compressed Gas Association Commodity Specification G-7.1-1966. Compressed oxygen shall not be used in supplied-air respirators or in open circuit self-contained breathing apparatus that have previously used compressed air. Oxygen must never be used with air line respirators.

29CFR1910 Part 134(d)(2)

Breathing air may be supplied to respirators from cylinders or air compressors.

29CFR1910 Part 134(d)(2)(ii)

The compressor for supplying air shall be equipped with necessary safety and standby devices. A breathing air-type compressor shall be used. Compressors shall be constructed and situated so as to avoid entry of contaminated air into the system and suitable in-line air purifying sorbent beds and filters installed to further assure breathing air quality. A receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in event of compressor failure, and alarms to indicate compressor failure and overheating shall be installed in the system. If an oil-lubricated compressor is used, it shall have a high-temperature or carbon monoxide alarm, or both. If only a high-temperature alarm is used, the air from the compressor shall be frequently tested for carbon monoxide to insure that it meets the specifications in paragraph (d)(1) of this section.

29CFR1910 Part 134(d)(3)

Air line couplings shall be incompatible with outlets for other gas systems to prevent inadvertent servicing of air line respirators with nonrespirable gases or oxygen.

29CFR1910 Part 134(d)(4)

Breathing gas containers shall be marked in accordance with American National Standard Method of Marking Portable Compressed Gas Containers to Identify the Material Contained, Z48.1-1954; Federal Specification BB-A-1034a, June 21, 1968, Air, Compressed for Breathing Purposes; or Interim Federal Specification GG-B-00675b, April 27, 1965, Breathing Apparatus, Self-Contained.

29CFR1910 Part 134(e)(1)

Use of respirators.
Standard procedures shall be developed for respirator use. These should include all information and guidance necessary for their proper selection, use, and care. Possible emergency and routine uses of respirators should be anticipated and planned for.

29CFR1910 Part 134(e)(2)

The correct respirator shall be specified for each job. The respirator type is usually specified in the work procedures by a qualified individual supervising the respiratory protective program. The individual issuing them shall be adequately instructed to insure that the correct respirator is issued.

29CFR1910 Part 134(e)(3)

Written procedures shall be prepared covering safe use of respirators in dangerous atmospheres that might be encountered in normal operations or in emergencies. Personnel shall be familiar with these procedures and the available respirators.

29CFR1910 Part 134(e)(3)(i)

In areas where the wearer, with failure of the respirator, could be overcome by a toxic or oxygen-deficient atmosphere, at least one additional man shall be present. Communications (visual, voice, or signal line) shall be maintained between both or all individuals present. Planning shall be such that one individual will be unaffected by any likely incident and have the proper rescue equipment to be able to assist the other(s) in case of emergency.

29CFR1910 Part 134(e)(3)(ii)

When self-contained breathing apparatus or hose masks with blowers are used in atmospheres immediately dangerous to life or health, standby men must be present with suitable rescue equipment.

29CFR1910 Part 134(e)(3)(iii)

Persons using air line respirators in atmospheres immediately hazardous to life or health shall be equipped with safety harnesses and safety lines for lifting or removing persons from hazardous atmospheres or other and equivalent provisions for the rescue of persons from hazardous

19.0 OCCUPATIONAL SAFETY AND HEALTH

atmospheres shall be used. A standby man or men with suitable self-contained breathing apparatus shall be at the nearest fresh air base for emergency rescue.

29CFR1910 Part 134(e)(5)(i)

Every respirator wearer shall receive fitting instructions including demonstrations and practice in how the respirator should be worn, how to adjust it, and how to determine if it fits properly. Respirators shall not be worn when conditions prevent a good face seal. Such conditions may be a growth of beard, sideburns, a skull cap that projects under the facepiece, or temple pieces on glasses. Also, the absence of one or both dentures can seriously affect the fit of a facepiece. The worker's diligence in observing these factors shall be evaluated by periodic check. To assure proper protection, the facepiece fit shall be checked by the wearer each time he puts on the respirator. This may be done by following the manufacturer's facepiece fitting instructions.

29CFR1910 Part 134(f)(2)(iv)

Maintenance and care of respirators. A record shall be kept of inspection dates and findings for respirators maintained for emergency use.

29CFR1910 Part 135(b)(1), Sentence 1

Protective helmets purchased after July 5, 1994 shall comply with ANSI Z89.1-1986, "American National Standard for Personnel Protection-Protective Headwear for Industrial Workers-Requirements," which is incorporated by reference, or shall be demonstrated to be equally effective.

29CFR1910 Part 136(a)

General requirements. Each affected employee shall wear protective footwear when working in areas where there is a danger of foot injuries due to falling and rolling objects, or objects piercing the sole, and where such employee's feet are exposed to electrical hazards.

29CFR1910 Part 138(a)

General requirements. Employers shall select and require employees to use appropriate hand protection when employees' hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.

29CFR1910 Part 138(b)

Selection. Employers shall base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified.

29CFR1910 Part 1001(g)(1)

Asbestos
(g) Respiratory protection -
(1) General. The employer shall provide respirators, and ensure that they are used, where required by this section. Respirators shall be used in the following circumstances:
(i) During the interval necessary to install or implement feasible engineering and work practice controls;
(ii) In work operations, such as maintenance and repair activities, or other activities for which engineering and work practice controls are not feasible;
(iii) In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the TWA and/or excursion limit; and
(iv) In emergencies.

29CFR1910 Part 1001(g)(2)

Asbestos
(g) Respirator protection.
(2) Respirator selection.
(i) Where respirators are required under this section, the employer shall select and provide, at no cost to the employee, the appropriate respirator as specified in Table 1. The employer shall select respirators from among those jointly approved as being acceptable for protection by the Mine Safety and Health Administration (MSHA) and by the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 30 CFR Part 11.

19.0 OCCUPATIONAL SAFETY AND HEALTH

(ii) The employer shall provide a powered, air-purifying respirator in lieu of any negative pressure respirator specified in Table 1 whenever:
(A) An employee chooses to use this type of respirator; and
(B) This respirator will provide adequate protection to the employee.

Table 1--Respiratory Protection for Asbestos Fibers

Airborne concentration of asbestos — Required respirator

Not in excess of 2 f/cc
1. Half-mask air-purifying respirator, other (10 X PEL) than a disposable respirator,equipped with high-efficiency filters.

Not in excess of 10 f/cc
1. Full facepiece air-purifying respirator (50 X PEL) equipped with high-efficiency filters.

Not in excess of 20 f/cc
1. Any powered air-purifying ` respirator (100 X PEL) equipped with high-efficiency filters.
2. Any supplied-air respirator operated in continuous flow mode.

Not in excess of 200 f/cc
1. Full facepiece supplied-air respirator (1000 X PEL) operated in pressure demand mode.

Greater than 200 f/cc
1. Full facepiece supplied air respirator (j 1,000 X PEL) or operated in pressure demand mode equipped with unknown concentration. an auxiliary positive pressure self-contained breathing apparatus.

Note:
a. Respirators assigned for higher environmental concentrations may be used at lower concentrations.
b. A high-efficiency filter means a filter that is at least 99.97 percent efficient against mono-dispersed particles of 0.3 micrometers or larger.

29CFR1910 Part 1001(g)(3)(i)

Asbestos
(g) Respiratory protection (3) Respirator program (i) Where respiratory protection is required, the employer shall institute a respirator program in accordance with 29 CFR 1910.134(b), (d), (e), and (f).

29CFR1910 Part 1001(g)(3)(ii)

Asbestos
(g) Respiratory protection (3) Respirator program (ii) The employer shall permit each employee who uses a filter respirator to change the filter elements whenever an increase in breathing resistance is detected and shall maintain an adequate supply of filter elements for this purpose.

29CFR1910 Part 1001(g)(3)(iii)

Asbestos
(g) Respiratory protection (3) Respirator program. (iii) Employees who wear respirators shall, be permitted to leave the regulated area to wash their faces and respirator facepieces whenever necessary to prevent skin irritation associated with respirator use.

29CFR1910 Part 1001(g)(3)(iv)

Asbestos
Respiratory protection (4) Respirator program. (iv) No employee shall be assigned to tasks requiring the use of respirators if, based upon his or her most recent examination, an examining physician determines that the employee will be unable to function normally wearing a respirator, or that the safety or health of the employee or other employees will be impaired by the use of a respirator. Such employee shall be assigned to another job or given the opportunity to transfer to a different position whose duties he or she is able to perform with the same employer, in the

19.0 OCCUPATIONAL SAFETY AND HEALTH

same geographical area and with the same seniority, status, and rate of pay the employee had just prior to such transfer, if such a different position is available.

29CFR1910 Part 1001(g)(4)(i)

Asbestos
(g) Respiratory protection
(4) Respirator fit testing.
(i) The employer shall ensure that the respirator issued to the employee exhibits the least possible facepiece leakage and that the respirator is fitted properly.

29CFR1910 Part 1001(g)(4)(ii)

Asbestos
(g) Respiratory protection
(4) Respirator fit testing.
(ii) For each employee wearing negative pressure respirators, employers shall perform either quantitative or qualitative face fit tests at the time of initial fitting and at least every six months thereafter. The qualitative fit tests may be used only for testing the fit of half-mask respirators where they are permitted to be worn, and shall be conducted in accordance with Appendix C. The tests shall be used to select facepieces that provide the required protection as prescribed in Table 1.

29CFR1910 Part 1001(h)(1)

Asbestos
(h) Protective work clothing and equipment
(1) Provision and use. If an employee is exposed to asbestos above the TWA and/or excursion limit, or where the possibility of eye irritation exists, the employer shall provide at no cost to the employee and ensure that the employee uses appropriate work clothing and equipment such as, but not limited to:
(i) Coveralls or similar full-body work clothing;
(ii) Gloves, head coverings, and foot coverings; and
(iii) Face shields, vented goggles, or other appropriate protective equipment which complies with 1910.133 of this Part.

29CFR1910 Part 1001(h)(2)

Removal and storage.

(i) The employer shall ensure that employees remove work clothing contaminated with asbestos only in change rooms provided in accordance with paragraph (i)(1) of this section.

(ii) The employer shall ensure that no employee takes contaminated work clothing out of the change room, except those employees authorized to do so for the purpose of laundering, maintenance, or disposal.

(iii) Contaminated work clothing shall be placed and stored in closed containers which prevent dispersion of the asbestos outside the container.

(iv) Containers of contaminated protective devices or work clothing which are taken out of change rooms or work places for cleaning, maintenance or disposal, shall bear labels in accordance with paragraph (j)(2) of this section.

29CFR1910 Part 1001(h)(3)

Cleaning and replacement.

(i) The employer shall clean, launder, repair, or replace protective clothing and equipment required by this paragraph to maintain their effectiveness. The employer shall provide clean protective clothing and equipment at least weekly to each affected employee.

(ii) The employer shall prohibit the removal of asbestos from protective clothing and equipment by blowing or shaking.

19.0 OCCUPATIONAL SAFETY AND HEALTH

(iii) Laundering of contaminated clothing shall be done so as to prevent the release of airborne fibers of asbestos in excess of the permissible exposure limits prescribed in paragraph (c) of this section.

(iv) Any employer who gives contaminated clothing to another person for laundering shall inform such person of the requirement in paragraph (h)(3)(iii) of this section to effectively prevent the release of asbestos in excess of the permissible exposure limits.

(v) The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with asbestos of the potentially harmful effects of exposure to asbestos.

(vi) Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable containers, and labeled in accordance with paragraph (j) of this section.

DOE5480.10 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.

DOE5480.10 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.

19.3.3 Facility and Equipment Safety Inspection and Maintenance

29CFR1910 Part 147(c)(6)(i)(A) thru (D)

The employer shall conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are followed.
(A) The periodic inspection shall be performed by an authorized employee other than the one(s) utilizing the energy control procedure being inspected.
(B) The periodic inspection shall be conducted to correct any deviations or inadequacies identified.
(C) Where lockout is used for energy control, the periodic inspection shall include a review, between the inspection and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected.
(D) Where tagout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized and affected employee, of that employee's responsibilities under the energy control procedure being inspected, and the elements set forth in paragraph (c)(7)(ii) of this section.

29CFR1910 Part 147(c)(6)(ii)

The employer shall certify that the periodic inspections have been performed. The certification shall identify the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection.

29CFR1910 Part 147(f)(1)

Lockout and Tagout
(f) Additional requirements.
(1) Testing or positioning of machines, equipment or components thereof. In situations in which lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment or component thereof, the following sequence of actions shall be followed:
(i) Clear the machine or equipment of tools and materials in accordance with paragraph (e)(1) of this section;
(ii) Remove employees from the machine or equipment area in accordance with paragraph (e)(2) of this section;
(iii) Remove the lockout or tagout devices as specified in paragraph (e)(3) of this section;
(iv) Energize and proceed with testing or positioning;
(v) Deenergize all systems and reapply energy control measure in accordance with paragraph (d) of this section to continue the servicing and/or

19.0 OCCUPATIONAL SAFETY AND HEALTH

maintenance.

29CFR1910 Part 179(j)(1)(ii)

Inspection procedure for cranes in regular service is divided into two general classifications based upon the intervals at which inspection should be performed. The intervals in turn are dependent upon the nature of the critical components of the crane and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are herein designated as "frequent" and "periodic" with respective intervals between inspections as defined below:

(a) Frequent inspection - Daily to monthly intervals.

(b) Periodic inspection - 1 to 12-month intervals.

29CFR1910 Part 179(j)(2)

Frequent inspection. The following items shall be inspected for defects at intervals as defined in paragraph (j)(1)(ii) of this section or as specifically indicated, including observation during operation for any defects which might appear between regular inspections. All deficiencies such as listed shall be carefully examined and determination made as to whether they constitute a safety hazard:

(i) All functional operating mechanisms for maladjustment interfering with proper operation. Daily.

(ii) Deterioration or leakage in lines, tanks, valves, drain pumps, and other parts of air or hydraulic systems. Daily.

(iii) Hooks with deformation or cracks. Visual inspection daily; monthly inspection with a certification records which includes the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, of the hook inspected. For hooks with cracks or having more than 15 percent in excess of normal throat opening or more than 10ø twist from the plane of the unbent hook refer to paragraph (l)(3)(iii)(a) of the section.

(iv) Host chains, including end connections, for excessive wear, twist, distorted links interfering with proper function, or stretch beyond manufacturer's recommendations. Visual inspection daily; monthly inspection with a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier of the chain which was inspected.

(v) [Reserved]

(vi) All functional operating mechanisms for excessive wear of components.

(vii) Rope reeving for noncompliance with manufacturer's recommendations.

29CFR1910 Part 179(j)(2)(i)

All functional operating mechanisms for maladjustment interfering with proper operation. Daily.

29CFR1910 Part 179(j)(2)(ii)

Deterioration or leakage in lines, tanks, valves, drain pumps, and other parts of air or hydraulic systems. Daily.

29CFR1910 Part 179(j)(2)(iii)

Hooks with deformation or cracks. Visual inspection daily; monthly inspection with a certification record which includes the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, of the hook inspected. For hooks with cracks or having more than 15 percent in excess of normal throat opening or more than 10ø twist from the plane of the unbent hook refer to paragraph (l)(3)(iii)(a) of this section.

29CFR1910 Part 179(j)(2)(iv)

Hoist chains, including end connections, for excessive wear, twist, distorted links interfering with proper function, or stretch beyond manufacturer's recommendations. Visual inspection daily; monthly inspection with a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier of the chain which was inspected.

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 179(j)(2)(vi)

All functional operating mechanisms for excessive wear of components.

29CFR1910 Part 179(j)(2)(vii)

Rope reeving for noncompliance with manufacturer's recommendations.

29CFR1910 Part 179(j)(3)

Periodic inspection. Complete inspections of the crane shall be performed at intervals as generally defined in paragraph (j)(1)(ii)(b) of this section, depending upon its activity, severity of service, and environment, or as specifically indicated below. These inspections shall include the requirements of paragraph (j)(2) of this section and in addition, the following items. Any deficiencies such as listed shall be carefully examined and determination made as to whether they constitute a safety hazard.
(i) Deformed, cracked, or corroded members.
(ii) Loose bolts or rivets.
(iii) Cracked or worn sheaves and drums.
(iv) Worn, cracked or distorted parts such as pins, bearings, shafts, gears, rollers, locking and clamping devices.
(v) Excessive wear on brake system parts, linings, pawls, and ratchets.
(vi) Load, wind, and other indicators over their full range, for any significant inaccuracies.
(vii) Gasoline, diesel, electric, or other powerplants for improper performance or noncompliance with applicable safety requirements.
(viii) Excessive wear of chain drive sprockets and excessive chain stretch.
(ix) Reserved
(x) Electrical apparatus, for signs of pitting or any deterioration of controller contractors, limit switches and pushbutton stations.

29CFR1910 Part 179(j)(4)(i)

Inspections. Cranes not in regular use. A crane which has been idle for a period of 1 month or more, but less than 6 months, shall be given an inspection conforming with requirements of paragraph (j)(2) of this section and paragraph (m)(2) of this section before placing in service.

29CFR1910 Part 179(j)(4)(ii)

Inspections. A crane which has been idle for a period of over 6 months shall be given a complete inspection conforming with requirements of paragraphs (j)(2) and (3) of this section and paragraph (m)(2) of this section before placing in service.

29CFR1910 Part 179(j)(4)(iii)

Inspections. Standby cranes shall be inspected at least semi-annually in accordance with requirements of paragraph (j)(2) of this section and paragraph (m)(2) of this section.

29CFR1910 Part 179(l)(1)

Maintenance. Preventive maintenance. A preventive maintenance program based on the crane manufacturer's recommendations shall be established.

29CFR1910 Part 179(l)(2)(i)

Maintenance procedure. Before adjustments and repairs are started on a crane the following precautions shall be taken:
(a) The crane to be repaired shall be run to a location where it will cause the least interference with other cranes and operations in the area.
(b) All controllers shall be at the off position.
(c) The main or emergency switch shall be open and locked in the open position.
(d) Warning or "out of order" signs shall be placed on the crane, also on the floor beneath or on the hook where visible from the floor.
(e) Where other cranes are in operation on the same runway, rail stops or other suitable means shall be provided to prevent interference with the idle crane.

29CFR1910 Part 179(l)(2)(ii)

Maintenance procedure. After adjustments and repairs have been made the crane shall not be operated until all guards have been reinstalled, safety devices reactivated and maintenance equipment removed.

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 179(l)(3)(i)

Adjustments and repairs. Any unsafe conditions disclosed by the inspection requirements of paragraph (j) of this section shall be corrected before operation of the crane is resumed. Adjustments and repairs shall be done only by designated personnel.

29CFR1910 Part 179(l)(3)(ii)

Adjustments shall be maintained to assure correct functioning of components. The following are examples:
(a) All functional operating mechanisms.
(b) Limit switches.
(c) Control systems.
(d) Brakes.
(e) Power plants.

29CFR1910 Part 179(l)(3)(iii)

Repairs or replacements shall be provided promptly as needed for safe operation. The following are examples:
(a) Crane hooks showing defects described in paragraph (j)(2)(iii) of this section shall be discarded. Repairs by welding or reshaping are not generally recommended. If such repairs are attempted they shall only be done under competent supervision and the hook shall be tested to the load requirements of paragraph (k)(2) of this section before further use.
(b) Load attachment chains and rope slings showing defects described in paragraph (j)(2) (iv) and (v) of this section respectively.
(c) All critical parts which are cracked, broken, bent, or excessively worn.
(d) Pendant control stations shall be kept clean and function labels kept legible.

29CFR1910 Part 179(m)(1)

Rope inspection. Running ropes. A thorough inspection of all ropes shall be made at least once a month and a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the ropes which were inspected shall be kept on file where readily available to appointed personnel. Any deterioration, resulting in appreciable loss of original strength, shall be carefully observed and determination made as to whether further use of the rope would constitute a safety hazard. Some of the conditions that could result in an appreciable loss of strength are the following:
(i) Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.
(ii) A number of broken outside wires and the degree of distribution or concentration of such broken wires.
(iii) Worn outside wires.
(iv) Corroded or broken wires at end connections.
(v) Corroded, cracked, bent, worn, or improperly applied end connections.
(vi) Severe kinking, crushing, cutting, or unstranding.

DOE5480.10 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.

DOE5480.19 Attachment I, Chapter IX, Section C.8

Periodic inspections should be conducted by authorized personnel, supervisor, or appropriate manager, to determine whether procedures are being followed and to correct any deviations or inadequacies observed. Inspections should include a review of the responsibilities of personnel and supervisors. The supervisor or appropriate manager should certify that the periodic inspections have been performed, documenting the equipment and procedures involved, dates of inspection, personnel participating in the inspections, and personnel performing the inspections.

19.0 OCCUPATIONAL SAFETY AND HEALTH

19.4.1 Health Examinations

29CFR1910 Part 1001(2)(1)

Asbestos
(l) Medical surveillance. (2) Preplacement examinations. (i) Before an employee is assigned to an occupation exposed to airborne concentrations of asbestos fibers, a preplacement medical examination shall be provided or made available by the employer. (ii) Such examination shall include, as a minimum, a medical and work history; a complete physical examination of all systems with emphasis on the respiratory system, the cardiovascular system and digestive tract; completion of the respiratory disease standardized questionnaire in Appendix D, Part 1; a chest roentgenogram (posterior-anterior 14 X17 inches); pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV 1.0); and any additional tests deemed appropriate by the examining physician. Interpretation and classification of chest roentgenograms shall be conducted in accordance with Appendix E.

29CFR1910 Part 1001(l)(1)

Asbestos
(l) Medical surveillance (1) General. (i) The employer shall institute a medical surveillance program for all employees who are or will be exposed to airborne concentrations of asbestos at or above the action level and/or excursion limit. (ii) Examination by a physician. (A) The employer shall ensure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and shall be provided without cost to the employee and at a reasonable time and place. (B) Persons other than licensed physicians, who administer the pulmonary function testing required by this section, shall complete a training course in spirometry sponsored by an appropriate academic or professional institution.

29CFR1910 Part 1001(l)(3)

Asbestos
(l) Medical surveillance. (3) Periodic examinations. (i) Periodic medical examinations shall be made available annually. (ii) The scope of the medical examination shall be in conformance with the protocol established in paragraph (1)(2)(ii) of this section, except that the frequency of chest roentgenograms shall be conducted in accordance with Table 2, and the abbreviated standardized questionnaire contained in Appendix D, Part 2, shall be administered to the employee.

29CFR1910 Part 1001(l)(5)

Asbestos
(l) Medical surveillance. (5) Recent examinations. No medical examination is required of any employee, if adequate records show that the employee has been examined in accordance with any of the preceding paragraphs [(l)(2)-(l)(4)] within the past 1 year period.

29CFR1910 Part 1001(l)(6)

Asbestos
(l) Medical surveillance.
(6) Information provided to the physician. The employer shall provide the following information to the examining physician:
(i) A copy of this standard and Appendices D and E.
(ii) A description of the affected employee's duties as they relate to the employee's exposure.
(iii) The employee's representative exposure level or anticipated exposure level.
(iv) A description of any personal protective and respiratory equipment used or to be used.
(v) Information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

29CFR1910 Part 1001(l)(7)

Asbestos
(l) Medical surveillance. (7) Physician's written opinion. (i) The employer shall obtain a written signed opinion from the examining physician. This written opinion shall contain the results of the medical examination and shall include;
(A) The physician's opinion as to whether the employee has any detected medical conditions that would place the employee at an increased risk of material health impairment from exposure to asbestos; (B) Any recommended limitations on the employee or upon the use of personal protective equipment such as clothing or respirators; and (C) A statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions resulting from asbestos exposure that require further explanation or treatment.

19.0 OCCUPATIONAL SAFETY AND HEALTH

(ii) The employer shall instruct the physician not to reveal in the written opinion given to the employer specific findings or diagnoses unrelated to occupational exposure to asbestos. (iii) The employer shall provide a copy of the physician's written opinion to the affected employee within 30 days from its receipt. (D) A statement that the employee has been informed by the physician of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure.

DOE5480.10 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)).

DOE5480.10 Section 9.f(5)

Industrial hygiene hazard inventories, reports, and monitoring data shall be readily accessible to the medical organization responsible for operating the medical monitoring program. Records access shall be provided to employees or designated representatives of employees in accordance with OSHA Regulation 29 CFR 1910.20 and DOE Privacy Act Regulation 10 CFR 1008.17(b)(5).

DOE5480.8A Section 11.b(2)

(2) Comprehensive Health Examination Content. The comprehensive health examination shall be conducted by an OHE under the direction of a licensed physician, using whatever ancillary assistance is needed in accordance with current, sound, and acceptable medical practices. The minimum content is described for the preplacement or other required comprehensive examinations. Additions may be needed, as determined by the Site Medical Director, considering the purpose(s) of the examination, health hazards of current and former employment, and personal health-risk factors.

(a) Medical History. The medical history shall include information concerning the employee's current illness or health status, review of systems, past medical history, occupational history, review of a current job task analysis, family history, immunization history, smoking and other lifestyle factors, allergy history, travel history, and history of mental or emotional disorders.

(b) Physical Examination. The physical examination shall include an evaluation of head, neck, eyes, ears, nose, throat, mouth, heart, lungs, abdomen, genitourinary system, vascular and lymphatic systems, skin, musculoskeletal system, a brief neurological examination, and a measurement of height, weight, pulse and blood pressure. A digital rectal and prostate examination shall be offered to males age 40 and above. Both a pelvic and breast examination shall be offered to females. It may include mammography, a pap smear, sigmoidoscopy, and tonometry over 34 years of age to conform to good preventive medicine practices. When the resources and capability will not permit the performance of these specialized examinations, the employee is to be advised as to their value and urged to obtain them from a personal physician.

(c) Laboratory Studies. The basic laboratory work shall include:

1 Vision testing (to include near, distant, color vision, depth perception, and horizontal peripheral field of vision);

2 Complete blood count and blood chemistry profile;

3 Urinalysis and serology when indicated;

4 An audiogram as a baseline, then every 3-5 years unless exposed to noise at or above 85 decibels, then annually;

5 A pulmonary function test as a baseline, then every 3-5 years unless exposed to pulmonary irritants, a history of pulmonary disease, or when OHE deems it necessary;

6 An electrocardiogram as a baseline, then annually for over age 50, a history of heart disease, or when OHE deems it necessary; and

7 Other laboratory tests required by OSHA/DOE shall be obtained.

(d) Guidelines for Use of X-rays. The recommendations and guidance contained in 43 FR 4377, of 2-1-78, should be considered. All

19.0 OCCUPATIONAL SAFETY AND HEALTH

radiographs shall be interpreted by a qualified radiologist or as specified by OSHA/DOE.

(e) Review and Evaluation of Examination. The OHE shall discuss the results of the examination with the employee. The OHE shall provide health counseling and advice, especially as related to risk factors that may cause premature morbidity or mortality. Employees shall be encouraged to have private physicians and should be referred to private physicians for any necessary definitive care or followup treatment, and for any necessary additional diagnostic studies that are beyond the scope of the occupational health examination. The health interests of employees are best served by close communication and cooperation between private and occupational health physicians.

DOE5480.8A 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 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.

DOE5480.8A Section 11.b(3)(b)

(b) Medical Surveillance Examinations and Health Monitoring. Standards and requirements for special health examinations and health monitoring of employees who work in jobs involving specific physical, chemical, or biological hazards shall be in accordance with applicable OSHA/DOE standards. When employees are exposed to potential hazards not covered by regulations, appropriate special examinations may be required as determined by the Site Medical Director and approved by the DOE Director, Office of Occupational Medicine.

DOE5480.8A Section 11.b(3)(c)

(c) Qualification Examinations.

1 Examinations shall be conducted to qualify employees for specific jobassignments for which specific medical qualification standards exist (e.g., drivers, pilots, protective force personnel, and respirator wearers).

2 Special medical evaluations shall be performed in response to contractor management's request to determine employee fitness for duty.

DOE5480.8A Section 11.b(3)(d)

(d) Voluntary Periodic Examinations. Voluntary periodic examinations shall be offered; however, it should be recognized that specific work hazards or statutory requirements as outlined in 11b(3)(b) and 11c may dictate more frequent health examinations to maintain an effective occupational medical program. A fundamental purpose of these examinations is to provide employees
with the periodic assessment of their health. Accordingly, relevant components of the comprehensive examination, paragraph 11b(2), may be included, as well as other preventive health measures such as health-risk appraisals or wellness counseling as authorized by the Site Medical Director.

19.0 OCCUPATIONAL SAFETY AND HEALTH

1 Employees age 50 and over shall be offered a biennial health examination. Content shall be based upon guidelines established by the Site Medical Director, considering work assignment and individual risk factors.

2 Employees age 40-49 shall be offered a health examination every 3 years.

3 Employees under age 40 shall be offered a health examination every 5 years.

DOE5480.8A Section 11.b(3)(e)

Return-to-Work Health Evaluations.

1 Occupational Injury or Illness. All employees with occupationally-related injuries or illnesses shall be evaluated before returning to work. The scope and content of this evaluation shall be determined by the OHE, based upon the nature and extent of the injury or disease, and shall be sufficient to ensure that the employee may return to work without undue health risk to self or others. Written clearance from the occupational medical department shall be required before such an employee may return to work.

2 Nonoccupational Injury or Illness. Contractor management, in the following situations, shall ensure that employees will not be allowed to return to work until they receive a health evaluation and written clearance from the occupational medical department. Situations warranting evaluation and clearance include nonoccupational-related illnesses or injuries causing absence from work for 5 consecutive workdays or more, procedures or treatments that would affect negatively the employee's ability to perform in a safe and reliable manner, and hospitalization. The employee shall provide relevant medical information from their private physician to assist in this determination. The final decision for health-related work recommendations shall reside with the Site Medical Director if a disagreement exists regarding return-to-work suitability.

DOE5480.8A Section 11.b(3)(f)

Termination Health Evaluations. A health status review shall be made available for all terminating employees. Based upon the information obtained, a health examination (the content to be determined by the Site Occupational Medical Director) shall be conducted, whenever possible, on employees with known occupational illnesses or injuries, documented or presumed exposures required by OSHA regulations, or when more than 1 year has elapsed since the last examination. This should include a review of the medical record, associated exposure information, and a signed response by the employee to each of the following questions:

1 Have there been recent occupational illnesses or injuries not previously reported?

2 Have you ever been informed of an exposure to radiation or toxic materials above permissible limits?

3 Do you have any complaints or concerns related to prior illnesses, injuries, or exposures?

4 Do you have any current medical complaints?

19.4.2 Health Maintenance and Preventive Medicine

DOE5480.10 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)).

DOE5480.8A Section 11.d(1)

EAP and Wellness Program.

(a) The Site Occupational Medical Director shall review and approve the medical aspects which include physical and mental health, stress and emotional/behavioral problems of all contractor-sponsored or supported EAP, as well as alcohol and other substance abuse rehabilitation programs. Program evaluation accountability shall include treatment processes, records, referrals, treatment outcomes, followup (aftercare

19.0 OCCUPATIONAL SAFETY AND HEALTH

programs), and staffing.

(b) The Site Occupational Medical Director shall review, approve and coordinate all contractor-sponsored or supported wellness programs as essential components of a preventive medicine program. Health counseling should be available to all employees. Program evaluation and accountability shall address the training/education opportunities provided, lesson plans,
class evaluation records, and referral/counseling sessions.

DOE5480.8A Section 11.d(2)

Immunization Program.

(a) Tetanus/Diphtheria immunization shall be available for all employees, consistent with Centers for Disease Control (CDC) guidelines.

(b) Employees involved in foreign travel shall be advised to obtain the immunizations recommended by CDC and the Public Health Service of the U.S. Department of Health and Human Services.

(c) In the interest of saving lost time off the job, elective care, such as serial desensitizations for allergy, may be given at the discretion of the Site Occupational Medical Director with the written advice and consent of the employee's private physician.

(d) Using CDC guidelines, influenza vaccine shall be offered to all employees.

(e) Hepatitis B vaccine shall be offered according to CDC guidelines.

(f) The Site Occupational Medical Director shall ensure that immunization programs for bloodborne pathogens and biohazardous waste conform to OSHA regulations and CDC guidelines for those employees at risk to these forms of exposure.

19.4.3 Diagnosis and Treatment

DOE5480.8A Section 11.c(1)

(1) Occupational Injury or Disease.

(a) The management of occupational injury or disease shall be in accordance with the laws and regulations of the State in which the facility is located.

(b) Diagnosis and treatment of occupational injury or disease shall be prompt with emphasis placed on rehabilitation and return to work at the earliest time compatible with job safety and employee health.

(c) Contractor management has the responsibility to establish procedures to ensure that all employees with occupational injuries or illnesses receive written clearance from the occupational medical department before being permitted to return to work.

(d) The responsible firstline management and health and safety groups (health physics, industrial hygiene, or safety) shall be given notification of unhealthy work situations detected by the occupational medical staff.

DOE5480.8A Section 11.c(2)

Nonoccupational Injury and Illness. Employees shall be encouraged to utilize the services of a private physician or medical facility, where these are available, for care of nonoccupational injuries or illnesses. However, the medical department shall assist employees who become ill at work. Care should be available for what may be judged a short-term, self-limited condition.
Such a policy will contribute to containment of medical costs and encourage an atmosphere of trust for employees. The objective is to return the worker to a state of health in the shortest possible time consistent with modern medical therapy. Long-term treatment of nonoccupational injury and illness is not considered to be a routine responsibility of an occupational medical program.
NOTE: In emergencies, employees shall be given the necessary care required until referred to a private physician or facility.

19.0 OCCUPATIONAL SAFETY AND HEALTH

DOE5480.8A Section 11.c(3)

Monitored Care. Monitored care of ill or injured employees by occupational medical physicians is highly desirable to maximize recovery and safe return to work and to minimize lost time and associated costs. Contractor management has the responsibility to advise the occupational medical department when an employee has been absent because of an illness or injury for more than 5 consecutive workdays, or has experienced excessive absenteeism. Worker's compensation cases should be monitored when appropriate through frequent return visits and physician-to-physician communication with private physicians where applicable. The goal is to assist the employees in their recovery and to facilitate their return to duty at the earliest practicable time. Reasonable accommodations or restrictions may be a part of this rehabilitation process and need to be closely coordinated with the human resources department and line management.

DOE5480.9A Section 10, Paragraph 1, Sentences 1-3

Program Requirements. The construction contractor shall establish and maintain a program to protect the safety and health of all persons on the construction worksite to include his or her employees, employees of other contractors or subcontractors, visitors and the public. This program also shall protect against damage to property, materials, supplies, and equipment and prevent unnecessary work interruptions. The program shall ensure compliance by the construction contractor and all worksite subcontractors with the safety and health standards prescribed in the construction project acquisition documents.

19.4.4 Fitness for Duty

DOE5480.8A Section 11.d(3)

(3) Fitness for Continued Duty Assignment. The occupational medical department has the responsibility to make fitness-for-duty determinations on employees for all conditions that may influence performance or work suitability.

(a) A substance abuse (drug and alcohol) identification and rehabilitation program is an integral part of a comprehensive fitness-for-duty program. Any testing provided shall be in accordance with acceptable practices and applicable regulations. The goal is to promote a safe and healthy work environment and to rehabilitate employees involved with substance abuse.

(b) Employees shall be evaluated for the presence of medical conditions that may be reasonably expected to impair employee's safe, reliable, and trustworthy performance of assigned tasks and, thereby, affect the acceptability of an employee for a specific job assignment.

(c) Occupational medical personnel shall consider the job duties of any employee seeking medical care to determine if the health condition is job related. In addition, an evaluation should be made of the employee's fitness-to-perform job duties safely and reliably.

19.4.5 Medical Facilities and Equipment

DOE5480.8A Section 11.h(1)

Occupational Medical Facilities. General design criteria for occupational medical facilities are contained in DOE 6430.1A. Specifically, these facilities:

(a) Shall be located in areas readily accessible to employees and to transportation. Accessibility of the occupational medical department is a key factor in employee utilization of medical services and is very important to the overall effectiveness of the program.

(b) Shall be sufficiently spacious, well lighted, and ventilated with appropriate climate control.

(c) Shall include waiting, consultation, examining and emergency treatment areas, toilet, and shower or tub facilities adequate to ensure privacy and comfort.

(d) Shall have necessary medical and laboratory equipment with adequate decontamination facilities.

(e) Shall include a rest or recovery room, dressing rooms, and facilities for the laboratory and radiological examinations performed in the department.

19.0 OCCUPATIONAL SAFETY AND HEALTH

(f) Shall include ambulance services and equipment that meet applicable State or Federal regulations. It is not necessary to assign responsibility for ambulance and rescue personnel, operations, and equipment to the Site Occupational Medical Director.

(g) Shall have access to medical information through a library and/or computerized information systems.

(h) Dispensing, storing and disposing of pharmaceuticals shall be in accordance with appropriate Federal, State and local law.

DOE5480.8A Section 11.h(2)

Equipment.

(a) The Site Occupational Medical Director shall ensure that the medical department equipment is adequate in terms of present-day accepted standards of medical practice and that it is maintained in good working order and is properly calibrated.

(b) The selection of specific kinds and brands of medical office and laboratory equipment shall be determined by the Site Occupational Medical Director. Preference should be given to devices that can provide direct input to computerized data systems. The following minimum items should be included:

1 Standard distant and near visual acuity eye charts or optical testers;

2 Standard color vision plates (Ishihara, Dvorine, or American Optical);

3 Audiometer with a testing booth which meets OSHA standards;

4 Electrocardiograph equipment;

5 Pulmonary function equipment;

6 Cardiac defibrillation and related monitoring equipment adequate for portable use;

7 Suction equipment;

8 Pulmonary resuscitation equipment;

9 Adequate equipment for monitoring, handling, and decontamination of radioactively contaminated or chemically contaminated casualties;

10 Physiotherapy equipment as needed; and

11 Emergency power supply.

19.4.7 Health Records and Reporting

29CFR1910 Part 20(d)(1)(i)

Preservation of records.
(1) Unless a specific occupational safety and health standard provides a different period of time, each employer shall assure the preservation and retention of records as follows:

(i) Employee medical records. The medical record for each employee shall be preserved and maintained for at least the duration of employment plus thirty (30) years, except that the following types of records need not be retained for any specified period:

(A) Health insurance claims records maintained separately from the employer's medical program and its records,

19.0 OCCUPATIONAL SAFETY AND HEALTH

(B) First aid records (not including medical histories) ofone-time treatment and subsequent observation of minor scratches, cuts, burns, splinters, and the like which do not involve medical treatment, loss of consciousness, restriction of work or motion, or transfer to another job, if made on-site by a non-physician and if maintained separately from the employer's medical program and its records, and

(C) The medical records of employees who have worked for less than (1) year for the employer need not be retained beyond the term of employment if they are provided to the employe upon the termination of employment.

29CFR1910 Part 20(d)(1)(ii)

Employee exposure records. Each employee exposure record shall be preserved and maintained for at least thirty (30) years, except that:

(A) Background data to environmental (workplace) monitoring or measuring, such as laboratory reports and worksheets, need only be retained for one (1) year as long as the sampling results, the collection methodology (sampling plan), a description of the analytical and mathematical methods used, and a summary of other background data relevant to interpretation of the results obtained, are retained for at least thirty (30) years; and

(B) Material safety data sheets and paragraph (c)(5)(iv) records concerning the identity of a substance or agent need not be retained for any specified period as long as some record of the identity (chemical name if known) of the substance or agent, where it was used, and when it was used is retained for at least thirty (30) years; and

(C) Biological monitoring results designated as exposure records by specific occupational safety and health standards shall be preserved and maintained as required by the specific standard.

29CFR1910 Part 20(d)(1)(iii)

Analyses using exposure or medical records. Each analysis using exposure or medical records shall be preserved and maintained for at least (30) years.

29CFR1910 Part 20(e)(1)(i)

Whenever an employee or designated representative requests access to a record, the employer shall assure that access is provided in a reasonable time, place, and manner. If the employer cannot reasonably provide access to the record within fifteen (15) working days, the employer shall within the fifteen (15) working days apprise the employee or designated representative requesting the record of the reason for the delay and the earliest date when the record can be made available.

29CFR1910 Part 20(e)(1)(ii)

The employer may require of the requester only such information as should be readily known to the requester and which may be necessary to locate or identify the records being requested (e.g., dates and locations where the employee worked during the time period in question).

29CFR1910 Part 20(e)(1)(iii)

Whenever an employee or designated representative requests a copy of a record, the employer shall assure that either:

(A) Copy of the record is provided without cost to the employee or representative,

(B) The necessary mechanical copying facilities (e.g., photocopying) are made available without cost to the employee or representative for copying the record, or

(C) The record is loaned to the employee or representative for a reasonable time to enable a copy to be made.

29CFR1910 Part 20(e)(iv)(2)

Employee and designated representative access --

(i) Employee exposure records.

(A) Except as limited by paragraph (f) of this section, each employer shall, upon request, assure the access to each employee and designated representative to employee exposure records relevant to the employee.

19.0 OCCUPATIONAL SAFETY AND HEALTH

DOE5480.8A Section 11.e

Requirements for Medical Records.

(1) Records Maintenance. The maintenance of complete medical records developed by the medical department for each employee from the time of the first examination or treatment is a basic requirement. A personal health record shall be maintained for each employee identifying name, date of birth, and social security number. The contractor may use additional identification systems as desired.

(2) Confidentiality.

(a) The confidentiality of all employee medical records, including the results of health examinations, shall be observed by all members of the occupational medical staff. Such records shall remain in the exclusive custody and control of the occupational medical department. Disclosure of information from an employee's health records shall not be made without written consent, except as permitted by law or Federal regulation.

(b) Computerized or microfilmed medical records and information shall remain under the custody and control of the Site Occupational Medical Director with disclosure as defined in paragraph 11e(2)(a) above.

(3) Access to Employee Medical Records. Access to employee medical records shall be in accordance with: (a) The Privacy Act as codified in 10 CFR 1008.17(b)(1); and (b) "Access to Exposure and Medical Records" as codified in 29 CFR 1910.20 (OSHA Standard).

(4) Identification of Medical Records. It shall be the responsibility of contractor management to provide the Site Occupational Medical Director with information to enable the coding or flagging of records to reflect current job titles, specific job certifications or limitations, assigned work areas, and work hazards.

(5) Work Restriction Registry. The Medical Director will advise contractor management of appropriate work restrictions. Contractor management should maintain a central work restriction registry.

(6) Retention of Medical Records. All employee health records shall be retained in accordance with DOE 1324.2A. However, inactive records may be retired to low-cost storage in an onsite records holding area or a Federal Records Center. To protect the confidentiality of the records, the shipping cartons shall be sealed and the transfer documents shall note that access to the records is limited to personnel of the Contractor Medical Department. If resources are available, the files may be microfilmed and the paper records destroyed.

19.5.1 OS&H Program Training

29CFR1910 Part 132(f)(1)

The employer shall provide training to each employee who is required by this section to use PPE. Each such employee shall be trained to know at least the following:

(i) When PPE is necessary;
(ii) What PPE is necessary;
(iii) How to properly don, doff, adjust, and wear PPE;
(iv) The limitations of the PPE; and,
(v) The proper care, maintenance, useful life and disposal of the PPE.

29CFR1910 Part 132(f)(2)

Each affected employee shall demonstrate an understanding of the training specified in paragraph (f)(1) of this section, and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.

29CFR1910 Part 132(f)(3)

When the employer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by paragraph (f)(2) of this section, the employer shall retrain each such employee. Circumstances where retraining is required include, but are not limited to, situations where:

19.0 OCCUPATIONAL SAFETY AND HEALTH

(i) Changes in the workplace render previous training obsolete; or
(ii) Changes in the types of PPE to be used render previous training obsolete; or
(iii) Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

29CFR1910 Part 132(f)(4)

The employer shall verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

29CFR1910 Part 147(c)(7)(i)

The employer shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees. the training shall include the following:
(A) Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.
(B) Each affected employee shall be instructed in the purpose and use of the energy control procedure.
(C) All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

29CFR1910 Part 147(c)(7)(ii)

When tagout systems are used, employees shall also be trained in the following limitations of tags:
(A) Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restrain on those devices that is provided by a lock.
(B) When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be by passed, ignored, or otherwise defeated.
(C) Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective.
(D) Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.
(E) Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.
(F) Tags must be securely attached to energy isolating devices so that they cannot inadvertently or accidentally detached during use.

29CFR1910 Part 147(c)(7)(iii)

Employee retraining
(A) Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures.
(B) Additional retraining shall also be conducted whenever a periodic inspection under paragraph (c)(6) of this section reveals, or whenever the employer has reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures.
(C) The retraining shall reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

29CFR1910 Part 332(b)(3)

Training
(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 equipment, (ii) The skills and techniques necessary to determine the nominal voltage of exposed live parts, and (iii) The clearance distances specified in 29 CFR 1910.333(c) and the corresponding voltages to which the qualified person will be exposed. Note 1: for the purpose of 29 CFR 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

19.0 OCCUPATIONAL SAFETY AND HEALTH

must be also have the training needed to meet 29 CFR 1910.333(c)(2).

29CFR1910 Part 1001(j)(5)(i)

The employer shall institute a training program for all employees who are exposed to airborne concentrations of asbestos at or above the action level and/or excursion limit and ensure their participation in the program.

29CFR1910 Part 1001(j)(5)(ii)

Training shall be provided prior to or at the time of initial assignment and at least annually thereafter.

29CFR1910 Part 1001(j)(5)(iii)

The training program shall be conducted in a manner which the employee is able to understand. The employer shall ensure that each employee is informed of the following:

(A) The health effects associated with asbestos exposure;
(B) The relationship between smoking and exposure to asbestos in producing lung cancer;
(C) The quantity, location, manner of use, release, and storage of asbestos, and the specific nature of operations which could result in exposure to asbestos;
(D) The engineering controls and work practices associated with the employee's job assignment;
(E) The specific procedures implemented to protect employees from exposure to asbestos, such as appropriate work practices, emergency and clean-up procedures, and personal protective equipment to be used;
(F) The purpose, proper use, and limitations of respirators and protective clothing;
(G) The purpose and a description of the medical surveillance program required by paragraph (l) of this section;
(H) The content of this standard, including appendices.
(I) The names, addresses and phone numbers of public health organizations which provide information, materials, and/or conduct programs concerning smoking cessation. The employer may distribute the list of such organizations contained in Appendix I, to comply with this requirement.
(J) The requirements for posting signs and affixing labels and the meaning of the required legends for such signs and labels.

29CFR1910 Part 1200(h)

Hazard Communication
(h) Employee information and training. Employers shall provide employees with information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new hazard is introduced into their work area.

29CFR1910 Part 1200(h)(1)

Hazard Communication
(h) Employee information and training. (1) 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.

29CFR1910 Part 1200(h)(2)

Hazard Communication
(h) Employee information and training (2) Training. Employee training shall include at least: (i) Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.); (ii) The physical and health hazards of the chemicals in the work area; (iii) The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and, (iv) The details of the hazard communication program developed by the employer, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

DOE5480.10 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

19.0 OCCUPATIONAL SAFETY AND HEALTH

allow appropriate disciplinary action to be taken when health and safety rules are violated.

DOE5480.10 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.

19.5.2 OS&H Training, Recordkeeping, and Reporting

29CFR1910 Part 147(c)(7)(iv)

The employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

19.6.1 OS&H Record Management and Exposure Reporting

29CFR1910 Part 20(d)(1)(i)

Preservation of records.
(1) Unless a specific occupational safety and health standard provides a different period of time, each employer shall assure the preservation and retention of records as follows:

(i) Employee medical records. The medical record for each employee shall be preserved and maintained for at least the duration of employment plus thirty (30) years, except that the following types of records need not be retained for any specified period:

(A) Health insurance claims records maintained separately from the employer's medical program and its records,
(B) First aid records (not including medical histories) ofone-time treatment and subsequent observation of minor scratches, cuts, burns, splinters, and the like which do not involve medical treatment, loss of consciousness, restriction of work or motion, or transfer to another job, if made on-site by a non-physician and if maintained separately from the employer's medical program and its records, and
(C) The medical records of employees who have worked for less than (1) year for the employer need not be retained beyond the term of employment if they are provided to the employe upon the termination of employment.

29CFR1910 Part 20(d)(1)(ii)

Employee exposure records. Each employee exposure record shall be preserved and maintained for at least thirty (30) years, except that:

(A) Background data to environmental (workplace) monitoring or measuring, such as laboratory reports and worksheets, need only be retained for one (1) year as long as the sampling results, the collection methodology (sampling plan), a description of the analytical and mathematical methods used, and a summary of other background data relevant to interpretation of the results obtained, are retained for at least thirty (30) years; and

(B) Material safety data sheets and paragraph (c)(5)(iv) records concerning the identity of a substance or agent need not be retained for any specified period as long as some record of the identity (chemical name if known) of the substance or agent, where it was used, and when it was used is retained for at least thirty (30) years; and

(C) Biological monitoring results designated as exposure records by specific occupational safety and health standards shall be preserved and maintained as required by the specific standard.

29CFR1910 Part 20(e)(1)(i)

Whenever an employee or designated representative requests access to a record, the employer shall assure that access is provided in a reasonable time, place, and manner. If the employer cannot reasonably provide access to the record within fifteen (15) working days, the employer shall within the fifteen (15) working days apprise the employee or designated representative requesting the record of the reason for the

19.0 OCCUPATIONAL SAFETY AND HEALTH

delay and the earliest date when the record can be made available.

29CFR1910 Part 20(e)(1)(iii)

Whenever an employee or designated representative requests a copy of a record, the employer shall assure that either:

(A) Copy of the record is provided without cost to the employee or representative,

(B) The necessary mechanical copying facilities (e.g., photocopying) are made available without cost to the employee or representative for copying the record, or

(C) The record is loaned to the employee or representative for a reasonable time to enable a copy to be made.

29CFR1910 Part 20(e)(iv)(2)

Employee and designated representative access --

(i) Employee exposure records.

(A) Except as limited by paragraph (f) of this section, each employer shall, upon request, assure the access to each employee and designated representative to employee exposure records relevant to the employee.

29CFR1910 Part 95(e)

Occupational noise exposure
(e) Employee notification. The employer shall notify each employee exposed at or above an 8-hour time-weighted average of 85 decibels of the results of the monitoring.

29CFR1910 Part 95(m)

Occupational noise exposure
(m) Recordkeeping-

(1) Exposure measurements. The employer shall maintain an accurate record of all employee exposure measurements required by paragraph (d) of this section.

(2) Audiometric tests.

(i) The employer shall retain all employee audiometric test records obtained pursuant to paragraph (g) of this section:
(ii) This record shall include:

(A) Name and job classification of the employee;
(B) Date of the audiogram;
(C) The examiner's name;
(D) Date of the last acoustic or exhaustive calibration of the audiometer; and
(E) Employee's most recent noise exposure assessment.
(F) The employer shall maintain accurate records of the measurements of the background sound pressure levels in audiometric test rooms.

(3) Record retention. The employer shall retain records required in this paragraph (m) for at least the following periods.

(i) Noise exposure measurement records shall be retained for two years.
(ii) Audiometric test records shall be retained for the duration of the affected employee's employment.

(4) Access to records. All records required by this section shall be provided upon request to employees, former employees, representatives designated by the individual employee, and the Assistant Secretary. The provisions of 29 CFR 1910,20 (a)-(e) and (g)(i) apply to access to

records under this section.

(5) Transfer of records. If the employer ceases to do business, the employer shall transfer to the successor employer all records required to be maintained by this section, and the successor employer shall retain them for the remainder of the period prescribed in paragraph (m) (3) of this section.

29CFR1910 Part 1001(d)(7)

Asbestos
(d) Exposure monitoring. (7) Employee notification of monitoring results. (i) The employer shall, within 15 working days after the receipt of the results of any monitoring performed under the standard, notify the affected employees of these results in writing either individually or by posting of results in an appropriate location that is accessible to affected employees. (ii) The written notification required by paragraph (d)(7)(i) of this section shall contain the corrective action being taken by the employer to reduce employee exposure to or below the TWA and/or excursion limit, wherever monitoring results indicated that the TWA and/or excursion limit had been exceeded.

29CFR1910 Part 1001(m)(1)

Asbestos
(m) Recordkeeping. (1) Exposure measurements. (i) The employer shall keep an accurate record of all measurements taken to monitor employee exposure to asbestos as prescribed in paragraph (d) of this section. (ii) This record shall include at least the following information: (A) The date of measurement; (B) The operation involving exposure to asbestos which is being monitored; (C) Sampling and analytical methods used and evidence of their accuracy; (D) Number, duration, and results of samples taken; (E) Type of respiratory protective devices worn, if any; and (F) Name, social security number and exposure of the employees whose exposure are represented. (iii) The employer shall maintain this record for at least thirty (30) years, in accordance with 29 CFR 1910.20.

29CFR1910 Part 1001(m)(2)

Objective data for exempted operations.

(i) Where the processing, use, or handling of products made from or containing asbestos is exempted from other requirements of this section under paragraph (d)(2)(iii) of this section, the employer shall establish and maintain an accurate record of objective data reasonably relied upon in support of the exemption.

(ii) The record shall include at least the following:

(A) The product qualifying for exemption;
(B) The source of the objective data;
(C) The testing protocol, results of testing, and/or analysis of the material for the release of asbestos;
(D) A description of the operation exempted and how the data support the exemption; and
(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(iii) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

Note: The employer may utilize the services of competent organizations such as industry trade associations and employee associations to maintain the records required by this section.

29CFR1910 Part 1001(m)(3)

Asbestos
(m) Recordkeeping. (3) Medical surveillance. (i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance by paragraph (l)(1)(i) of this section, in accordance with 29 CFR 1910.20. (ii) The record shall include at least the following information: (A) The name and social security number of the employee; (B) Physician's written opinions; (C) Any employee medical complaints related to exposure to asbestos; and (D) A copy of the information provided to the physician as required by paragraph (l)(6) of this section. (iii) The employer shall ensure that this record is maintained for the duration of employment plus thirty (30) years, in accordance with 29 CFR 1910.20.

19.0 OCCUPATIONAL SAFETY AND HEALTH

29CFR1910 Part 1001(m)(4)

Asbestos
(m) Recordkeeping (4) Training. The employer shall maintain all employee training records for one (1) year beyond the last date of employment of that employee.

29CFR1910 Part 1001(m)(5)

Asbestos
(m) Recordkeeping (5) Availability. (i) The employer, upon written request, shall make all records required to be maintained by this section available to the Assistant Secretary and the Director for examination and copying. (ii) The employer, upon request shall make any exposure records required by paragraph (m)(1) of this section available for examination and copying to affected employees, former employees, designated representatives and the Assistant Secretary, in accordance with 29 CFR 1910.20 (a)-(e) and (g)-(i). (iii) The employer, upon request, shall make employee medical records required by paragraph (m)(2) of this section available for examination and copying to the subject employee, to anyone having the specific written consent of the subject employee, and the Assistant Secretary, in accordance with 29 CFR 1910.20.

29CFR1910 Part 1001(m)(6)

Asbestos
(m) Recordkeeping.
(6) Transfer of records.
(i) The employer shall comply with the requirements concerning transfer of records set forth in 29 CFR 1910.20(h).
(ii) Whenever the employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, the employer shall notify the Director at least 90 days prior to disposal of records and, upon request, transmit them to the Director.

DOE5480.10 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.

DOE5480.10 Section 9.f(4)

Records shall be retained in accordance with DOE 1324.2, RECORDS DISPOSITION.

DOE5483.1A 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.

DOE5483.1A Chapter I, Section 5.e

e. All contractor employees or former employees shall have access to their personal safety, health, and medical records consistent with the provisions of the Freedom of Information Act and the Privacy Act.

DOE5483.1A Chapter III, 2

2. 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.

19.0 OCCUPATIONAL SAFETY AND HEALTH

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."

19.6.3 Occupational Injury and Illness Reporting

DOE5480.10 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.

DOE5483.1A 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.

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19.0 OCCUPATIONAL SAFETY AND HEALTH

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19.0 OCCUPATIONAL SAFETY AND HEALTH

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20.0 ENVIRONMENTAL PROTECTION

20.0 ENVIRONMENTAL PROTECTION

20.1.1 National Environmental Policy Act

10CFR1021 Part 200(a)

DOE shall provide for adequate and timely NEPA review of DOE proposals including those for programs, policies, projects, regulations orders, or legislation, in accordance with 40 CFR 1501.2 and this section. In its planning for each proposal DOE shall include adequate time and funding for proper NEPA review and for preparation of anticipated NEPA documents.

10CFR1021 Part 211

Limitations on actions during the NEPA process. While DOE is preparing an EIS that is required under 1021.300(a) of this part DOE shall take no action concerning the proposal that is the subject of the EIS before issuing an ROD except as provided at 40 CFR 1506.1. Actions that are covered by or are a part of a DOE proposal for which an EIS is being prepared shall not be categorically excluded under subpart D of these regulations unless they qualify as interim actions under 40 CFR 1506.1.

10CFR1021 Part 300

(a) DOE shall determine, under the procedures in the CEQ Regulations and this part, whether any DOE proposal:

(1) Requires preparation of an EIS;
(2) Requires preparation of an EA; or
(3) Is categorically excluded from preparation of either an EIS or an EA. DOE shall prepare any pertinent documents as required by NEPA, the CEQ Regulations, or this part.

(b) Notwithstanding any other provision of these regulations, DOE may prepare a NEPA document for any DOE action at any time in order to further the purposes of NEPA. This may be done to analyze the consequences of ongoing activities, support DOE planning, assess the need for mitigation, fully disclose the potential environmental consequences of DOE actions, or for any

10CFR1021 Part 321

Requirements for environmental assessments.

(a) When to prepare an EA. As required by 40 CFR 1501.4(b) DOE shall prepare an EA for a proposed DOE action that is described in the classes of actions listed in appendix C to subpart D of this part and for a proposed DOE action that is not described in any of the classes of actions listed in appendices A B, or D to subpart D except that an EA is not required if DOE has decided to prepare an EIS. DOE may prepare an EA on any action at any time in order to assist agency planning and descisionmaking.

(b) Purposes. A DOE EA shall serve the purposes identified in 40 CFR 1508.9(a) which include providing sufficient evidence and analysis for determining whether to prepare an EIS or to issue a FONSI. If appropriate a DOE EA shall also include any floodplain/wetlands assessment prepared under 10 CFR part 1022 and may include analyses needed for other environmental determinations.

(c) Content. A DOE EA shall comply with the requirements found at 40 CFR 1508.9. In addition to any other alternatives DOE shall assess the no action alternative in an EA even when the propose.

10CFR1021 Part 400

Level of NEPA review.

(a) This subpart identifies DOE actions that normally:

(1) Do not require preparation of either and EIS or an EA (are categorically excluded from preparation of either document)(appendices A and B to this subpart D);
(2) Require preparation of an EA but not necessarily and EIS (appendix C to this subpart D); or
(3) Require preparation of an EIS (appendix D to this subpart D).

(b) Any completed valid NEPA review does not have to be repeated, and no completed NEPA documents need to be redone by reasons of these

20.0 ENVIRONMENTAL PROTECTION

regulations except as provided in 1021.314.

(c) If a DOE proposal is encompassed within a class of actions listed in the appendices to this subpart D DOE shall proceed with the level of NEPA review indicated for that class of actions unless there are extraordinary circumstances related to the specific proposal that may affect the significance of the environmental effects of the proposal.

(d) If a DOE proposal is not encompassed within the classes of actions listed in the appendices to this subpart D or if there are extraordinary circumstances related to the proposal that may affect the significance.

10CFR1021 Part 410

Application of categorical exclusions (classes of actions that normally do not require EAs or EISs).

(a) The actions listed in appendices A and B to this subpart D are classes of actions that DOE has determined do not individually or cumulatively have a significant effect on the human environment (categorical exclusions).

(b) To find that a proposal is categorically excluded DOE shall determine the following:

(1) The proposal fits within a class of actions that is listed in appendix A or B to this subpart D;
(2) There are no extraordinary circumstances related to the proposal that may affect the significance of the environmental effects of the proposal. Extraordinary circumstances are unique situations presented by specific proposals such as scientific controversy about the environmental effects of the proposal; uncertain effects or effects involving unique or unknown risks; or unresolved conflicts concerning alternate uses of available resources within the meaning of section 102(2)(E) of NEPA; and
(3) The proposal is not "concerned" (40 CFR 1508.25(a)(1)) to other actions with potentially significant impacts is not related to other proposed actions with cumulatively significant impacts (40 CFR 1508.25(a)(2)) and is not precluded by 40 CFR 1506.1 or 1021.211 of this part.

40CFR1501 Part 2

Apply NEPA early in the process.
Agencies shall integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values, to avoid delays later int the process and to head off potential conflicts. Each agency shall:
(a) Comply with the mandate of section 102(2)(A) to "utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decisionmaking which may have an impact on man's environment: as specified by 1507.2.
(b) Identify environmental effects and values in adequate detail so they can be compared to economic and technical analyses. Environmental documents and appropriate analyses shall be circulated and reviewed at the same time as other planning documents.
(c) Study, develop and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act.
(d) Provide for cases where actions are planned by private applicants of other non-Federal entities before Federal involvement so that:
(1) Policies or designated staff are available to advise potential applicants of studies or other information foreseeably required for later Federal action.
(2) The Federal agency consults early with appropriate State and local agencies and Indian tribes and with interested private persons and organizations when its own involvement is reasonably foreseeable.
(3) The Federal agency commences its NEPA process at the earliest possible time.

40CFR1506 Part 1(a)

Limitations on actions during NEPA process.
(a) Until an agency issues a record of decision as provided in 1505.2 (except as provided in paragraph (c) of this section), no action concerning the proposal shall be taken which would:
(1) Have an adverse environmental impact; or
(2) Limit the choice of reasonable alternatives.

20.0 ENVIRONMENTAL PROTECTION

40CFR1506 Part 2(b)

Agencies shall cooperate with State and local agencies to the fullest extent possible to reduce duplication between NEPA and State and local requirements,unless the agencies are specifically barred from doing so by some other law. Except for cases covered by paragraph (a) of this section, such cooperation shall to the fullest extent possible include:
(1) Joint planning processes.
(2) Joint environmental research and studies.
(3) Joint public hearings (except where otherwise provided by statute).
(4) Joint environmental assessments.

40CFR1508 Part 25(a)(1)

Connected actions, which means that they are closely related and therefore should be discussed in the same impact statement. Actions are connected if they:

(i) Automatically trigger other actions which may require environmental impact statements.
(ii) Cannot or will not proceed unless other actions are taken previously or simultaneously.
(iii) Are interdependent parts of a larger action and depend on the larger action for their justification.

40CFR1508 Part 25(a)(2)

Cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement.

40CFR1508 Part 4

Categorical exclusion.
"Categorical exclusion" means a category of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a Federal agency in implementation of these regulations (1507.3) and for which, therefore, neither an environmental assessment nor an environmental impact statement is required. An agency may decide in its procedures or otherwise, to prepare environmental assessments for the reasons stated in 1508.9 even though it is not required to do so. Any procedures under this section shall provide for extraordinary circumstances in which a normally excluded action may have a significant environmental effect.

40CFR1508 Part 9

"Environmental assessment":
(a) Means a concise public document for which a Federal agency is responsible that serves to:
(1) Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.
(2) Aid an agency's compliance with the Act when no environmental impact statement is necessary.
(3) Facilitate preparation of a statement when one is necessary.
(b) Shall include brief discussions of the need for the proposal of alternatives as required by section 102(2)(E), of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted.

20.1.2 State Environmental Policy Act

WAC-173-802(840615) Section 080

Mitigated DNS.

(1) An applicant may ask the department whether issuance of a DS is likely for a proposal. This request for early notice must:

(a) Be written:
(b) Follow submission of a permit application and environmental checklist for a nonexempt proposal for which the department is lead agency; and
(c) Precede the department's actual threshold determination for the proposal.

20.0 ENVIRONMENTAL PROTECTION

(2) The responsible official or his designee shall respond to the request within ten working days of receipt of the letter; the response shall:

(a) Be written;
(b) State whether the department is considering issuance of a DS;
(c) Indicate the general or specific area(s) of concern that led the department to consider a DS; and
(d) State that the applicant may change or clarify the proposal to mitigate the impacts indicated in the letter, revising the environmental checklist as necessary to reflect the changes or clarifications.

(3) The department shall not continue with the threshold determination until after receiving a written response from the applicant changing or clarifying the proposal or asking that the threshold determination be based on the original proposal.

(4) If the applicant submits a changed or clarified proposal, along with a revised environmental checklist, the department will make its threshold determination based on the changed or clarified proposal.

(a) If the department's response to the request for early notice indicated specific mitigation measures that would remove all probable significant adverse environmental impacts, and the applicant changes or clarifies the proposal to include all of those specific mitigation measures, the department shall issue a determination of nonsignificance and circulate the DNS for comments as in WAC 197-11-350(2).
(b) If the department indicated general or specific areas of concern, but did not indicate specific mitigation measures that would allow it to issue a DNS, the department shall determine if the changed or clarified proposal may have a probable significant environmental impact, issuing a DNS or DS as appropriate.

(5) The department may specify mitigation measures that would allow it to issue a DNS without a request for early notice from an applicant. If it does so, and applicant changes or clarifies the proposal to include those measures, the department shall issue a DNS and circulate it for review under WAC 197-11-350(2).

(6) When an applicant changes or clarifies the proposal, the clarifications or changes may be included in written attachments to the documents already submitted. If the environmental checklist and supporting documents would be difficult to read and/or understand because of the need to read them in conjunction with the attachment(s), the department may require the applicant to submit a new checklist.

(7) The department may change or clarify features of its own proposals before making the threshold determination.

(8) The department's written response under subsection (2) of this section shall not be construed as a determination of significance. In addition, preliminary discussion of clarification of or changes to a proposal, as opposed to a written request for early notice, shall not bind the department to consider the clarifications or changes in its threshold determination.

(9) When an applicant submits a changed or clarified proposal pursuant to this section, it shall be considered part of the applicant's application for a permit or other approval for all purposes, including enforcement of the permit or other approval. Unless the department's decision expressly states otherwise, when a mitigated DNS is issued for a proposal, any decision approving the proposal shall be based on the proposal as changed or clarified pursuant to this section.

WAC-197-11 Section 305

Categorical exemptions.
(1) If a proposal fits within any of the provisions in Part Nine of these rules, the proposal shall be categorically exempt from threshold determination requirements (WAC 197-11-720) except as follows:

(a) The proposal is not exempt under WAC 197-11-908, environmentally sensitive areas.

(b) The proposal is a segment of a proposal that includes:

(i) A series of actions, physically or functionally related to each other, some of which are categorically exempt and some of which are not; or
(ii) A series of exempt actions that are physically or functionally related to each other, and that together may have a probable significant adverse

20.0 ENVIRONMENTAL PROTECTION

environmental impact in the judgment of an agency with jurisdiction. If so, that agency shall be the lead agency, unless the agencies with jurisdiction agree that another agency should be the lead agency. Agencies may petition the department of ecology to resolve disputes (WAC 197-11-946). For such proposals, the agency or applicant may proceed with the exempt aspects of the proposals, prior to conducting environmental review, if the requirements of WAC 197-11-070 are met.

(2) An agency is not required to document that a proposal is categorically exempt. Agencies may note on an application that a proposal is categorically exempt or place such a determination in agency files.

WAC-197-11 Section 640

The SEPA process shall be combined with the existing planning, review, and project approval processes being used by each agency with jurisdiction. When environmental documents are required, they shall accompany a proposal through the existing agency review processes. Any environmental document in compliance with SEPA may be combined with any other agency documents to reduce duplication and paperwork and improve decision making. The page limits in these rules shall be met, or the combined document shall contain, at or near the beginning of the document, a separate summary of environmental considerations, as specified by WAC 197-11-440(4). SEPA page limits need not be met for joint state-federal EISs prepared under both SEPA and NEPA, in which case the NEPA page restrictions (40 CFR 1502.7) shall apply.

WAC-197-11 Section 960

The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help (applicants) and the agency identify impacts from the proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

20.2.1.1 State Waste Discharge

WAC-173-216 Section 110(3)

Representatives of the department shall have the right to enter at all reasonable times in or upon any property, public or private, for the purpose of inspecting and investigating conditions relating to the pollution or the possible pollution of any waters of the state. Reasonable times shall include normal business hours, hours during which production, treatment, or discharge occurs, or times when the department suspects a violation requiring immediate inspection. Representatives of the department shall be allowed to have access to, and copy at reasonable cost, any records required to be kept under terms and conditions of the permit, to inspect any monitoring equipment or method required in the permit and to sample the discharge, waste treatment processes, or internal waste streams.

WAC-173-216 Section 110(4)

The permittee shall at all times be responsible for the proper operation and maintenance of any facilities or systems of control installed by the permittee to achieve compliance with the terms and conditions of the permit. Where design criteria have been established, the permittee shall not permit flows or waste loadings to exceed approved design criteria or approved revisions thereto.

WAC-173-216 Section 110(5)

A new application, or supplement to the previous application, shall be submitted, along with required engineering plans and reports, whenever a new or increased discharge or change in the nature of the discharge is anticipated which is not specifically authorized by the current permit. Such application shall be submitted at least sixty days prior to any proposed changes.

WAC-173-216 Section 110(6)

In the event the permittee is unable to comply with any of the permit terms and conditions due to any cause, the permittee shall:

(a) Immediately take action to stop, contain, and clean up unauthorized discharges or otherwise stop the violation, and correct the problem;

(b) Immediately notify the department of the failure to comply; and

(c) Submit a detailed written report to the department within thirty days, unless requested earlier by the department, describing the nature of the violation, corrective action taken and/or planned, steps to be taken to prevent a recurrence, and any other pertinent information.

20.0 ENVIRONMENTAL PROTECTION

20.2.1.2 Underground Injection Control (UIC) Registration

WAC-173-218 Section 010

(1) The purpose of this chapter is to set forth the procedures and practices applicable to the injection of fluids through wells.

(2) Permits issued in accordance with the provisions of this chapter are designed:

(a) To satisfy the intent and requirements of Part C of the Federal Safe Drinking Water Act (SDWA) 42 U.S.C. & 300th et seq. as authorized by RCW 43.21A.445 and of the Water Pollution Control Act, chapter 90.48 RCW; and

(b) To preserve and protect ground waters, including underground sources of drinking water, for existing and future beneficial uses.

WAC-173-218 Section 040

No fluids may be injected through wells except as authorized pursuant to this chapter.

WAC-173-218 Section 050

(1) New Class I injection wells are prohibited.

(2) All persons operating an existing Class I injection well operation must apply to the department for approval to operate within one year of the effective date of this chapter.

(3) The department will accept, process, and act upon the application in accordance with applicable requirements as contained in 40 Code of Federal Regulations Parts 124 and 144 as published in Federal Register Volume 48, No. 64 (April 1, 1983) and Part 146 as published in Federal Register Volume 45, No. 123 (June 24, 1980), Volume 46, No. 166 (August 27, 1981) and Volume 47, No. 23 (February 3, 1982).

WAC-173-218 Section 060

(1) Any person, who proposes to conduct or is conducting a Class II injection well operation, as defined in WAC 173-218-030 (3)(a), must notify the oil and gas conservation committee (OGCC) in accordance with the provisions of general rules, chapter 344-12 WAC.

(2) The department shall perform review, evaluation, and approval in accordance with the provisions of general rules, chapter 344-12 WAC.

(3) The department shall process a Class II injection well application, as defined in WAC 173-218-030 (3)(a), in accordance with applicable requirements as contained in 40 Code of Federal Regulations Parts 124 and 144 as published in Federal Register Volume 48, No. 64 (April 1, 1983) and Part 146 as published in Federal Register Volume 45, No. 123 (June 24, 1980), Volume 46, No. 166 (August 27, 1981) and Volume 47, No. 23 (February 3, 1982)

(4) At present, there appears to be no reasonable likelihood that approval will be sought for a Class II injection well for either enhanced recovery of oil or natural gas or for storage of liquid hydrocarbons; therefore, Class II injection wells as defined in 173-218-030 (3)(b) and (3)(c) are not authorized. If it appears likely that approval will be sought for either of these types of injection wells, these regulations will be amended to include an appropriate regulatory program.

WAC-173-218 Section 080

Class IV injection wells.
Class IV injection wells are prohibited regardless of proximity to USDW.

WAC-173-218 Section 090

Class V injection wells.
(1) All new Class V injection wells that inject industrial, municipal, or commercial waste fluids into or above an USDW are prohibited.

(2) All persons operating an existing Class V injection well, that inject industrial, commercial, or municipal waste fluids into or above an USDW, must apply to the department for approval to operate within one year of the effective date of this regulation. The department will accept, process,

20.0 ENVIRONMENTAL PROTECTION

and act upon the application in accordance with the procedures and practices of the State waste discharge permit program, chapter 173-216 WAC.

(3) All other Class V injection well owners and operators must notify the department of the location of injection wells within one year of approval of the state underground injection control program by the United States Environmental Protection Agency. The notification shall be on a form as prescribed by the department and will include the information needed to satisfy the requirements of 40 Code of Federal Regulations Part 146.52.

WAC-173-218 Section 100

(1) Any permit issued by the department shall specify conditions necessary to prevent and control injection of fluids into the waters of the state, including the following, whenever applicable:

(a) All know, available, and reasonable methods of prevention, control, and treatment;

(b) Applicable requirements as contained in 40 Code of Federal Regulations Parts 124 and 144 as published in Federal Register Volume 48, No. 64 (April 1, 1983) and Part 146 as published in Federal Register Volume 45, No. 123 (June 24, 1980), Volume 46, No. 166 (August 27, 1981) and Volume 47, No. 23 (February 3, 1982); and

(c) Any conditions necessary to preserve and protect USDW.

(2) Any injection well that causes or allows the movement of fluid into an USDW that may result in a violation of any primary drinking water standard under 40 Code of Federal Regulations Part 141 or that may otherwise adversely affect the beneficial use of an USDW is prohibited.

20.2.1.3 Domestic Sewage

WAC-246-272 Section 030

These regulations shall apply to all on-site sewage systems except the following:

(1) New construction for which a permit was issued prior to July 1, 1984, or adoption of local regulations and is still valid. The regulations in effect at the time the permit was issued shall apply, except where portions of the new regulations are less stringent;

(2) An extension, alteration, or replacement necessitated by the failure of an existing on-site sewage system and is not on a marine shoreline. These regulations shall be applied to the maximum extent permitted by the site. A permit shall be required as per WAC 248-96-080 (Permit);

(3) Permit applications for systems located in subdivisions having received preliminary approval or having been filed for record between July 1, 1979, and June 30, 1984 (chapter 58.17 RCW). The regulations in effect at the time preliminary or final approval was given shall apply, unless the local board of health finds a change in conditions creates a serious threat to the public health; and

(4) Facilities constructed or operated in accordance with a permit or approval issued by the Washington state department of ecology. Where these regulations may be in conflict with chapters 90.48 or 70.95B RCW, said RCW shall govern.

WAC-246-272 Section 090(1)

No person shall install or cause to be installed a new on-site sewage system, nor perform any alterations, extensions, or relocations or connections to an existing system without a valid permit issued by the health officer. Larger on-site sewage systems approved by the department are exempt from permit requirements. Permits for alterations or repairs shall be so identified. Application for such permit shall be made in writing in a manner prescribed by the health officer. Each permit application shall include a reminder of the applicant's right of appeal. The authority to issue permits shall not be delegated by the health officer.

WAC-246-272 Section 190

The health officer may make inspections during construction to determine compliance with these regulations. No part of any installation shall be covered until approval has been obtained from the health officer. The health officer may waive this requirement provided the installation has been made by a person certified under WAC 248-96-175 and a designer program has been established according to WAC 248-96-130 provided that

20.0 ENVIRONMENTAL PROTECTION

the designer performs the final inspection. If deviations from the approved plans and specifications have occurred in construction, a complete set of certified "as-built" drawings shall be provided to the health officer for a permanent record of the installation.

20.2.1.4 National Pollution Discharge Elimination System

40CFR 122 Part 1(b)(1)

Scope of the NPDES permit requirement.
The NPDES program requires permits for the discharge of "pollutants" from any "point source" into "waters of the United States." The terms "pollutant", "point source" and "waters of the United States" are defined in 122.2.

40CFR 122 Part 21(a)

Application for a permit (applicable to State programs, see 123.25).
Duty to apply. Any person who discharges or proposes to discharge pollutants or who owns or operates a "sludge-only facility" and who does not have an effective permit, except persons covered by general permits under 122.28, excluded under 122.3, or a user of a privately owned treatment works unless the Director requires otherwise under 122.44(m), shall submit a complete application (which shall include a BMP program if necessary under 40 CFR 125.102) to the Director in accordance with this section and part 124.

40CFR 122 Part 21(d)(3)(i)

All applicants for EPA-issued permits, other than POTWs, new sources, and "sludge-only facilities," must complete Forms 1 and either 2b or 2c of the consolidated permit application forms to apply under 122.21 and paragraphs (f), (g), and (h) of this section.

40CFR 122 Part 21(f)

Information requirements. All applicants for NPDES permits shall provide the following information to the Director, using the application form provided by the Director (additional information required of applicants is set forth in paragraphs (g) through (k) of this section).

(1) The activities conducted by the applicant which require it to obtain an NPDES permit.

(2) Name, mailing address, and location of the facility for which the application is submitted.

(3) Up to four SIC codes which best reflect the principal products or services provided by the facility.

(4) The operator's name, address, telephone number, ownership status, and status as Federal, State, private, public, or other entity.

(5) Whether the facility is located on Indian lands.

(6) A listing of all permits or construction approvals received or applied for under any of the following programs:

(i) Hazardous Waste Management program under RCRA.
(ii) UIC program under SDWA.
(iii) NPDES program under CWA.
(iv) Prevention of Significant Deterioration (PSD) program under the Clean Air Act.
(v) Nonattainment program under the Clean Air Act.
(vi) National Emission Standards for Hazardous Pollutants (NESHAPS) preconstruction approval under the Clean Air Act.
(vii) Ocean dumping permits under the Marine Protection Research and Sanctuaries Act.
(viii) Dredge or fill permits under section 404 of CWA.
(ix) Other relevant environmental permits, including State permits.

(7) A topographic map (or other map if a topographic map is unavailable) extending one mile beyond the property boundaries of the source, depicting the facility and each of its intake and discharge structures; each of its hazardous waste treatment, storage, or disposal facilities; each well where fluids from the facility are injected underground; and those wells, springs, other surface water bodies, and drinking water wells listed in public records or otherwise known to the applicant in the map area.

20.0 ENVIRONMENTAL PROTECTION

(8) A brief description of the nature of the business.

40CFR 122 Part 29

(4)(i) No on-site construction of a new source for which an EIS is required shall commence before final Agency action in issuing a final permit incorporating appropriate EIS-related requirements, or before execution by the applicant of a legally binding written agreement which requires compliance with all such requirements, unless such construction is determined by the Regional Administrator not to cause significant or irreversible adverse environmental impact. The provisions of any agreement entered into under this paragraph shall be incorporated as conditions of the NPDES permit when it is issued.

40CFR 122 Part 41(a) Introduction

Duty to comply. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violations of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

40CFR 122 Part 41(a)(1)

The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.

40CFR 122 Part 41(b)

Duty to reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.

40CFR 122 Part 41(d)

Duty to mitigate. The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

40CFR 122 Part 41(e)

Proper operation and maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve.

40CFR 122 Part 41(f)

Permit actions. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

40CFR 122 Part 41(h)

Duty to provide information. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the Director upon request, copies of records required to be kept by this permit.

40CFR 122 Part 41(i)

Inspection and entry. The permittee shall allow the Director, or any authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

(1) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

(2) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

20.0 ENVIRONMENTAL PROTECTION

(3) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

(4) Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substance or parameters at any location.

40CFR 122 Part 41(k)

Signatory requirement.

(1) All applications, reports, or information submitted to the Director shall be signed and certified. (See 122.22)

(2) The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

40CFR 122 Part 41(l)(2)

Anticipated noncompliance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

40CFR 122 Part 41(l)(5)

Compliance schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

40CFR 122 Part 41(l)(7)

Other noncompliance. The permittee shall report all instances of noncompliance not reported under paragraphs (l)(4), (5), and (6) of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph (l)(6) of this section.

40CFR 122 Part 41(l)(8)

Other information. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

40CFR 122 Part 41(m)(2)

Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraph (m)(3) and (m)(4) of this section.

40CFR 122 Part 41(m)(4)

Prohibition of bypass.

(i) Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

(A) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(B) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(C) The permittee submitted notices as required under paragraph (m)(3) of this section.

(ii) The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three

20.0 ENVIRONMENTAL PROTECTION

conditions listed above in paragraph (m)(4)(i) of this section.

40CFR 122 Part 41(n)(3)

Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(i) An upset occurred and that the permittee can identify the cause(s) of the upset;

(ii) The permitted facility was at the time being properly operated; and

(iii) The permittee complied with any remedial measures required under paragraph (d) of this section.

40CFR 129 Part 4

Toxic pollutants.
The following are the pollutants subject to regulation under the provisions of this subpart:

(a) Aldrin/Dieldrin-Aldrin means the compound aldrin as identified by the chemical name, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro - 1,4 - endo-5,8-exo-dimethanonaphthalene; "Dieldrin" means the compound dieldrin as identified by the chemical name 1,2,3,4,10,10-hexachloro - 6,7 - epoxy 1,4,4a,5,6,7,8,8a-octahydro-1,4-endo-5,8-exo-dimethanonaphthalene.

(b) DDT-DDT means the compounds DDT, DDD, and DDE as identified by the chemical names: (DDT)-1,1,1-trichloro-2,2 - bis(p - chlorophenyl) ethane and some o,p'-isomers; (DDD) or (TDE) - 1,1 - dichloro - 2,2- bis(p-chlorophenyl) ethane and some o,p'- isomers; (DDE) - 1,1 - dichloro-2,2-bis(p-chlorophenyl) ethylene.

(c) Endrin-Endrin means the compound endrin as identified by the chemical name 1,2,3,4,10,10-hexachloro-6,7-epoxy - 1,4,4a,5,6,7,8,8a - octahydro - 1,4-endo-5,8-endodimethanonaphthalene.

(d) Toxaphene-Toxaphene means a material consisting of technical grade chlorinated camphene having the approximate formula of C (10)H (10)Cl 8 and normally containing 67-69 percent chlorine by weight.

(e) Benzidine-Benzidine means the compound benzidine and its salts as identified by the chemical name 4,4'-diaminobiphenyl.

(f) Polychlorinated Biphenyls (PCBs) polychlorinated biphenyls (PCBs) means a mixture of compounds composed of the biphenyl molecule which has been chlorinated to varying degrees.

40CFR 129 Part 5

Compliance.

(a)(1) Within 60 days from the date of promulgation of any toxic pollutant effluent standard or prohibition each owner or operator with a discharge subject to that standard or prohibition must notify the Regional Administrator (or State Director, if appropriate) of such discharge. Such notification shall include such information and follow such procedures as the Regional Administrator (or State Director, if appropriate) may require.

(2) Any owner or operator who does not have a discharge subject to any toxic pollutant effluent standard at the time of such promulgation but who thereafter commences or intends to commence any activity which would result in such a discharge shall first notify the Regional Administrator (or State Director, if appropriate) in the manner herein provided at least 60 days prior to any such discharge.

(b) Upon receipt of any application for issuance or reissuance of a permit or for a modification of an existing permit for a discharge subject to a toxic pollutant effluent standard or prohibition the permitting authority shall proceed thereon in accordance with 40 CFR part 124 or 125, whichever is applicable.

20.0 ENVIRONMENTAL PROTECTION

(c)(1) Every permit which contains limitations based upon a toxic pollutant effluent standard or prohibition under this part is subject to revision following the completion of any proceeding revising such toxic pollutant effluent standard or prohibition regardless of the duration specified on the permit.

(2) For purposes of this section, all toxic pollutants for which standards are set under this part are deemed to be injurious to human health within the meaning of section 402(k) of the Act unless otherwise specified in the standard established for any particular pollutant.

(d)(1) Upon the compliance date for any section 307(a) toxic pollutant effluent standard or prohibition, each owner or operator of a discharge subject to such standard or prohibition shall comply with such monitoring, sampling, recording, and reporting conditions as the Regional Administrator (or State Director, if appropriate) may require for that discharge. Notice of such conditions shall be provided in writing to the owner or operator.

(2) In addition to any conditions required pursuant to paragraph (d)(1) of this section and to the extent not required in conditions contained in NPDES permits, within 60 days following the close of each calendar year each owner or operator of a discharge subject to any toxic standard or prohibition shall report to the Regional Administrator (or State Director, if appropriate) concerning the compliance of such discharges. Such report shall include, as a minimum, information concerning

(i) relevant identification of the discharger such as name, location of facility, discharge points, receiving waters, and the industrial process or operation emitting the toxic pollutant;

(ii) relevant conditions (pursuant to paragraph (d)(1) of this section or to an NPDES permit) as to flow, section 307(a) toxic pollutant concentrations, and section 307(a) toxic pollutant mass emission rate;

(iii) compliance by the discharger with such conditions.

(3) When samples collected for analysis are composited, such samples shall be composited in proportion to the flow at time of collection and preserved in compliance with requirements of the Regional Administrator (or State Director, if appropriate), but shall include at least five samples, collected at approximately equal intervals throughout the working day.

(e)(1) Nothing in these regulations shall preclude a Regional Administrator from requiring in any permit a more stringent effluent limitation or standard pursuant to section 301(b)(1)(C) of the Act and implemented in 40 CFR 125.11 and other related provisions of 40 CFR part 125.

(2) Nothing in these regulations shall preclude the Director of a State Water Pollution Control Agency or interstate agency operating a National Pollutant Discharge Elimination System Program which has been approved by the Administrator pursuant to section 402 of the Act from requiring in any permit a more stringent effluent limitation or standard pursuant to section 301(b)(1)(C) of the Act and implemented in 40 CFR 124.42 and other related provisions of 40 CFR part 124.

(f) Any owner or operator of a facility which discharges a toxic pollutant to the navigable waters and to a publicly owned treatment system shall limit the summation of the mass emissions from both discharges to the less restrictive standard, either the direct discharge standard or the pretreatment standard; but in no case will this paragraph allow a discharge to the navigable waters greater than the toxic pollutant effluent standard established for a direct discharge to the navigable waters.

(g) In any permit hearing or other administrative proceeding relating to the implementation or enforcement of these standards, or any modification thereof, or in any judicial proceeding other than a petition for review of these standards pursuant to section 509(b)(1)(C) of the Act, the parties thereto may not contest the validity of any national standards established in this part, or the ambient water criterion established herein for any toxic pollutant.

40CFR 129 Part 8

Compliance date.

(a) The effluent standards or prohibitions set forth herein shall be complied with not later than one year after promulgation unless an earlier date

20.0 ENVIRONMENTAL PROTECTION

is established by the Administrator for an industrial subcategory in the promulgation of the standards or prohibitions.

(b) Toxic pollutant effluent standards or prohibitions set forth herein shall become enforceable under sections 307(d) and 309 of the Act on the date established in paragraph (a) of this section regardless of proceedings in connection with the issuance of any NPDES permit or application therefor, or modification or renewal thereof.

PUBLIC-LAW-100-605 Section 2(a)

Interim Protection.
For a period of eight years after the enactment of this Act, within the study area identified in section 1 of this Act:

(1) No Federal agency may construct any dam, channel, or navigation project.

(2) All other new Federal and non-Federal projects and activities shall, to the greatest extent practicable:

(A) be planned, designed, located and constructed to minimize direct and adverse effects on the values for which the river is under study; and
(B) utilize existing structures and facilities including, but not limited to, pipes, pipelines, transmission towers, water conduits, powerhouses, and reservoirs to accomplish the purpose of the project or activity.

(3) Federal and non-Federal entities planning new projects or activities in the study area shall consult and coordinate with the Secretary to minimize and provide mitigation for any direct and adverse effects on the values for which the river is under study.

(4) Upon receiving notice from the entity planning the new project or activity, the Secretary shall, no later than ninety days after receiving such notice and consulting with the entity:

(A) review the proposed project or activity and make a determination as to whether there will be a direct and adverse effect on the values for which the river segment is under study; and

(B) review proposals to mitigate such effects and make such recommendations for mitigation as he deems necessary.

(5) If the Secretary determines that there will be a direct and adverse effect that has not been adequately mitigated, he shall notify the sponsoring entity and the Committee on Interior and Insular Affairs of the United States House of Representatives and the Committee on Energy and Natural Resources of the United State Senate of his determination and any proposed recommendations.

PUBLIC-LAW-100-605 Section 2(b)

During the eight year interim protection period, provided by this section, all existing projects that affect the study area shall be operated and maintained to minimize any direct and adverse effects on the values for which the river is under study, taking into account any existing and relevant license, permit, or agreement affecting the project.

WA000374-3 Part I.A.1

Effluent Limitations, Monitoring Requirements, And Schedule Compliance
During the period beginning on the effective date of this permit and lasting through the expiration date, the permittee is authorized to discharge from outfall(s) serial number(s) 003.

a. Such discharges shall be limited as specified below:
- Flow - m3/day(MGD), 500 (0.132) daily average Discharge Limit, monthly measurement frequency, daily total sample.
- Suspended Solids, 30 mg/l daily average Discharge Limit, with 45 mg/l daily maximum discharge limit, monthly measurements, grab samples.

b. There shall be no discharge of floating solids of visible foam in other than trace amounts.

c. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: Prior to discharge to the Columbia River.

20.0 ENVIRONMENTAL PROTECTION

WA000374-3 Part I.A.2

During the period beginning on the effective date of this permit and lasting through the expiration date, the permittee is authorized to discharge from outfall(s) serial number(s) 004.

a. Such discharges shall be limited as specified below:

Total Combined Discharge:

- Flow - m3/day (MGD), 15,000(3.96) daily average discharge limit, 20,000(5.28) daily maximum discharge limit, continuous measurements;

- Temperature, 75.0 daily maximum discharge limit, weekly measurements, grab samples;
Secondary Cooling Water:

- Free available Chlorine, 0.3(0.6) kg/day daily average discharge limit, 0.8(1.8) lbs/day daily maximum discharge limit, 0.2 mg/l daily average discharge limit, 0.5 mg/l daily maximum discharge limit, weekly measurements, grab samples;
Water Filter Plant Backwash Water:

- Flow - m3/day (MGD), 2271(0.60) daily average discharge limit, 2271(0.60) daily maximum discharge limit, each discharge get measurements, total sample;

- Suspended Solids, 30 mg/l daily average discharge limit, 45 mg/l daily maximum discharge limit, weekly measurements, grab samples.

b. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored monthly with a grab sample.

c. There shall be no discharge of floating solids or visible foam in other trace amounts.

d. Neither free available chlorine nor total residual chlorine shall be discharged for more than two hours in any one day.

e. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: The total combined discharge samples shall be taken prior to discharge to the Columbia River. The secondary cooling water discharge samples shall be taken prior to combining with any other flow; the water filter plant backwash water samples shall be taken prior to combining with any other discharge.

20.2.1.5 Stormwater Discharge

40CFR 122 Part 29(c)(4)(i)

New sources and new dischargers.
No on-site construction of a new source for which an EIS is required shall commence before final Agency action in issuing a final permit incorporating appropriate EIS-related requirements, or before execution by the applicant of a legally binding written agreement which requires compliance with all such requirements, unless such construction is determined by the Regional Administrator not to cause significant or irreversible adverse environmental impact. The provisions of any agreement entered into under this paragraph shall be incorporated as conditions of the NPDES permit when it is issued.

20.2.2.1 Notice of Construction

40CFR 61 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.

20.0 ENVIRONMENTAL PROTECTION

(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.

40CFR 61 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.

LAPCA-REG1 Article 8, Section 8.02

A. All asbestos removal projects under Section 8.01 and those which do not fall under Sections 8.01 or 8.02(B) but are greater than 20 square feet or 35 linear feet are subject to the notification requirements and fee schedule described in Section 10.07.

B. Residential units are defined as any building with four or fewer dwelling units each containing space for uses such as living, sleeping, preparation of food, and eating that is used, occupied, or intended or designed to be occupied by one family as their domicile. This term includes houses, mobile homes, trailers, houseboats, and houses with a "mother-in-law apartment" or "guest room". This term does not include any mixed-use building, structure, or installation that contains a residential unit. Owners or operators of residential asbestos projects are exempt form Section 8.01, but are subject to the following restrictions:

1. A written notification on forms provided by the Authority shall be submitted to the Authority prior to the asbestos removal.
2. A filing fee as described in Section 10.07 of this regulation shall accompany the written notice.
3. The owner or operator of the residential project must participate in a prescribed educational program prepared by the Authority concerning the hazards of asbestos removal in the home. This program will include, but may not be limited to:
a. Watching an informational video,
b. Agreement to read and understand informational pamphlets, provided by the Authority, concerning proper residential asbestos removal. Any questions pertaining to this material shall be addressed by the Authority.

4. If after reviewing the notification form, interviewing the applicant about methods of removal and disposal, and inspecting the site as deemed necessary, the Authority may grant permission for owner or operator, or require a certified asbestos contractor to perform removal.

LAPCA-REG1 Article 8, Section 8.03

A. In the event of an unexpected discovery of asbestos during a renovation or demolition project, which was originally thought to contain no asbestos, the requirements of either Section 8.01 or 8.02 are applicable, and all work must stop until these requirements have been met.

B. During an approved renovation or demolition project, if an unexpected discovery of additional asbestos is made which increases the project by 20% or greater than originally reported, an amendment or emergency waiver form must be filed with the Authority before work may continue.

WAC-173-400 Section 110(1)

(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

20.0 ENVIRONMENTAL PROTECTION

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.

WAC-173-400 Section 110(4)

(4) Appeals. An order of approval, any conditions contained in an order of approval, or the denial of a notice of construction application may be appealed to the pollution control hearings board as provided in chapter 43.21B RCW. Ecology or the authority shall promptly mail copies of each order approving or denying a notice of construction application to the applicant and to any other party who submitted timely comments on the application, along with a notice advising parties of their rights of appeal to the Pollution Control Hearings Board and, where applicable, to the EPA Environmental Appeals Board.

WAC-173-400 Section 115 (1)

Standards of performance for new sources.

Title 40, Code of Federal Regulations, Part 60 (standards of performance for new sources), as promulgated prior to July 1, 1989, is adopted by reference except for sections 60.5 (determination of construction or modification) and 60.6 (review of plans). (1) Sections 60.5 and 60.6 of Title 40, Code of Federal Regulations, are not incorporated herein because they provide for preconstruction review of new sources only on request. Such review under the state program is mandatory and an order of approval is required prior to construction, installation or establishment of a new source.

WAC-173-401 Section 500(3)

Duty to apply. For each chapter 401 source, the owner or operator shall submit a timely and complete permit application in accordance with this section. Whenever practicable, the applicant shall utilize methods provided by the permitting authority for electronic transmission of the completed application.

(a) Existing chapter 401 sources. Chapter 401 sources in existence on the date of EPA approval of the state permit program shall submit permit applications no later than one hundred eighty days after EPA approval of the state permitting program.

(b) Existing sources becoming chapter 401 sources due to future regulations. An existing source may become subject to the operating permit program as a result of regulations promulgated after EPA approval of the state permit program. For those sources, a complete application must be submitted within twelve months from the time that the source becomes subject to the permit program.

(c) New or modified sources. New or modified chapter 401 sources which commence operation after EPA approval of the state operating program shall file a complete application to obtain the chapter 401 permit or permit revision within twelve months after commencing operation. Where an existing chapter 401 permit would prohibit such construction or change in operation, the source must obtain a permit revision before commencing operation. The applicant may elect to integrate procedures for new source review and operating permit issuance as described in subsection (10) of this section.

(d) Permit renewal. For purposes of permit renewal, a timely application is one that is submitted at the time specified in WAC 173-401-710.

(e) Applications for initial phase II acid rain permits shall be submitted to the permitting authority by January 1, 1996, for sulfur dioxide, and by January 1, 1998, for nitrogen oxides.

WAC-173-401 Section 725(4)(a)

Significant modification procedures.

20.0 ENVIRONMENTAL PROTECTION

Criteria. Significant modification procedures shall be used for applications requesting permit modifications that do not qualify as minor permit modifications or as administrative permit amendments. Every significant change in existing monitoring permit terms or conditions and every relaxation of reporting or recordkeeping permit terms or conditions shall be considered significant. Nothing herein shall be construed to preclude the permittee from making changes consistent with this chapter that would render existing permit compliance terms and conditions irrelevant.

WAC-173-401 Section 725(4)(b)

Significant permit modifications shall meet all requirements of this chapter, including those for applications, public participation, review by affected states, and review by EPA, as they apply to permit issuance and permit renewal. The permitting authority shall complete review on the majority of significant permit modifications within nine months after receipt of a complete application.

20.2.2.2 Toxic Air Pollutants

WAC-173-460(940112) Section 030(2)(a)

Exempt sources.
Containers such as tanks, barrels, drums, cans, and buckets are exempt from the requirements of this chapter unless equipped with a vent other than those required solely as safety pressure release devices.

WAC-173-460(940112) 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.

WAC-173-460(940112) Section 040(1)(b)

The notice of construction and new source review applies only to the affected emission unit(s) and the contaminants emitted from the emission unit(s).

WAC-173-460(940112) Section 040(1)(c)

New source review of a modification shall be limited to the emission unit or units proposed to be modified and the toxic air contaminants whose emission would increase as a result of the modification.

WAC-173-460(940112) 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.

WAC-173-460(940112) Section 050(1)(a)

Requirement to quantify emissions. New sources.
When applying for a notice of construction, and 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.

20.0 ENVIRONMENTAL PROTECTION

WAC-173-460(940112) Section 050(1)(b)

Emissions shall be quantified in sufficient detail to determine whether the source complies with the requirements of this chapter.

WAC-173-460(940112) 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 that the applicable emission rates listed in WAC 173-460-080.

WAC-173-460(940112) Section 050(3)

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.

WAC-173-460(940112) 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.

WAC-173-460(940112) Section 060 Introduction

Control technology requirements.
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.

WAC-173-460(940112) 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.

WAC-173-460(940112) Section 080(2)(a)

Acceptable source impact analysis.
Carcinogenic effects. The owner of operator shall use dispersion modeling to estimate the maximum incremental ambient impact of each Class A TAP from the source and compare the estimated incremental ambient values to the Class A acceptable source impact levels in WAC 173-460-150. If applicable, the source may use the small quantity emission rate tables in (e) of this subsection.

WAC-173-460(940112) Section 080(2)(b)

Other toxic effects. The owner or operator shall use dispersion modeling to estimate the maximum incremental ambient impact of each Class B TAP from the source and compare the estimated ambient values to the Class B acceptable source impact levels in WAC 173-460-160. If applicable, the source may use the small quantity emission rate tables in (e) of this subsection.

WAC-173-460(940112) Section 080(2)(c)

Dispersion modeling. The owner or operator shall use dispersion modeling techniques in accordance with EPA guidelines. If concentrations predicted by dispersion screening models exceed applicable acceptable source impact levels, more refined modeling and/or emission estimation techniques shall be used. Refined modeling techniques shall be approved by ecology and the authority. (Note: EPA's Guideline on Air Quality

20.0 ENVIRONMENTAL PROTECTION

Models, EPA 450/2-78-027R, can be obtained through NTIS (703) 487-4650 or can be downloaded from the OAQPS Technology Transfer Network electronic bulletin board system).

WAC-173-460(940112) Section 080(2)(d)

Averaging times. The owner or operator shall use the average times in (d)(i), (ii), (iii) of this subsection unless alternate averaging times are approved by ecology. Ecology may allow the use of an alternate averaging time if it determines that the operating procedures of the source may cause a high concentration of a TAP for a short period and that consideration of potential health effects due to peak exposures may be warranted for the TAP.

(i) An annual average shall be used for Class A TAPs listed in WAC 173-460-150(2).
(ii) The averaging times specified in WAC 173-460-150(3) shall be used for Class A TAPs listed in WAC 173-460-150(3).
(iii) A twenty-four-hour averaging time shall be used for Class B TAPs listed in WAC 173-460-160.

WAC-173-460(940112) Section 080(2)(e)

Small quantity emission rates. Instead of using dispersion modeling to show compliance with ambient impact demonstration requirements in WAC 173-460-080 and 173-460-090, a source may use the small quantity emission rate tables for all toxic air pollutants with acceptable source impact levels equal to or greater than 0.001 ug/m3. A source must first meet control technology and emission quantification requirements of WAC 173-460-050 and 173-460-060, then demonstrate that the source emission rate does not exceed the rates specified in the appropriate table below.

Small Quantity Emission Rates
Class A Toxic Air Pollutants
Acceptable Source Impact Level (Annual ug/m3); TAP Emission Pounds per Year (10 meter stack and downwash):
0.001 to 0.0099, 0.5
0.01 to 0.06, 10
0.07 to 0.12, 20
0.13 to 0.99, 50
1.0 to 10, 500
Small Quantity Emission Rates

Class B Toxic Air Pollutants
Acceptable Source Impact Level (24 hour ug/m3); TAP Pounds per Year; TAP Pounds per Hour:
Less than 1, 175, 0.02
1 to 9.9, 175, 0.02
10 to 29.9, 1,750, 0.20
30 to 59.9, 5,250, 0.60
60 to 99.9, 10,500, 1.20
100 to 129.9, 17,500, 2.0
130 to 250, 22,750, 2.6
Greater than 250, 43,748, 5.0

WAC-173-460(940112) Section 090(1)(a)

Applicability.
The power or operator who cannot demonstrate class A or class b TAP source compliance with WAC 173-460-070 and 173-460-080 using an acceptable source impact level analysis as provided in WAC 173-460-080(2), may submit a petition requesting ecology perform a second tier analysis evaluation to determine a means of compliance with WAC 173-460-070 and 173-460-080 by establishing allowable emissions for the source. Petitions for second tier analysis evaluation shall be submitted to the local authority or ecology within ten days of receipt. A second tier analysis evaluation may be requested when a source wishes to more accurately characterize risks, to justify risks greater than acceptable source impact levels, or to otherwise modify assumptions to more accurately represent risks. Risks may be more accurately characterized by utilizing updated EPA unit risk factors, inhalation reference concentrations, or other EPA recognized or approved methods. Ecology shall specify the maximum allowable emissions of any class A or class B TAP source based on ecology's second tier analysis evaluation.

20.0 ENVIRONMENTAL PROTECTION

WAC-173-460(940112) Section 090(4)(a)

Contents of the second tier analysis.
The second tier analysis consists of a health impact assessment. The applicant shall complete and submit a health impact assessment to ecology which includes the following information. Ecology may approve the submittal of less information if it is determines that such information is sufficient to perform the second tier analysis evaluation. The health impact assessment shall be prepared in accordance with EPA's risk assessment guidelines as defined in WAC 173-460-020(9).

(i) Demographics such as population size, growth, and sensitive subgroups;
(ii) Toxicological profiles of all toxic air pollutants that exceed the ASIL;
(iii) Characterization of existing pathways and total daily intake for toxic air pollutants that exceed the ASIL;
(iv) Contribution of the proposed source toward total daily intake for toxic air pollutants that exceed the ASIL;
(v) Using existing data, characterization of risk from current exposure to the toxic air pollutants that exceed the ASIL. This includes existing TAP sources in the area, and anticipated risk from the new source;
(vi) Additive cancer risk for all Class A toxic air pollutants which may be emitted by the source;
(vii) Other information requested by ecology and pertinent to ecology's decision to approve the second tier application;
(viii) Uncertainty in the data; and
(ix) Length of exposure and persistence in the environment.

WAC-173-460(940112) Section 090(4)(b)

The health assessment shall utilize current scientific information. New scientific information on the toxicological characteristics of toxic air pollutants may be used to justify modifications of upper bound unit risk factors used to calculate ASIL's in WAC 173-460-150 and/or absorption rates of individual toxic air pollutants if ecology determines there is compelling scientific data which demonstrates that the use of EPA recognized or approved methods are inappropriate.

WAC-173-460(940112) Section 100(1)

The owner or operator of a source that emits Class A TAPs that are likely to result in an increased cancer risk of more than one hundred thousand may request that ecology establish allowable emissions for the source.

WAC-173-460(940112) Section 100(2)

Contents of the application.
The applicant shall meet the submittal requirements of WAC 173-460-090(1) and submit all materials required under WAC 173-460-090(4) and (5). The applicant may submit the request for a risk management decision concurrently with the second tier analysis application. Prior denial of the second tier analysis application under WAC 173-460-090(6) is not required.

WAC-173-460(940112) Section 100(6)

Time limitation. The owner operator shall commence construction within eighteen months o f the director's approval.

20.2.2.3 Radionuclide Emissions

FF-01 Conditions and Limitations

Conditions and Limitations
- The collective emissions from all registered sources from all areas on the reservation shall meet the emission requirements of Chapter 173-480-040 WAC.
- Operations shall be consistent with 40 CFR 61, the Washington Clean Air Act (RCW 70.94) and WAC 246-247.
- Site inspections must be allowed following DOE security access requirements to verify these conditions.
- Access requirements to all emissions points shall be clarified by January 1, 1994.
- The department shall be notified of any source location changes.

WAC-246-247(940131) 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.

WAC-246-247(940131) Section 060(1)

Requirements for new construction or modification or 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 authority. For new construction, this action shall constitute registration of the emission unit(s).

WAC-246-247(940131) 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 mission 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.

WAC-246-247(940131) 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).

WAC-246-247(940131) 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

20.0 ENVIRONMENTAL PROTECTION

requirements and limitations of the license.

WAC-246-247(940131) Section 060(8)

Facilities may request a single categorical license which identifies limits and conditions of operation for similar multipurpose temporary and/or portable emission units. When applicable, the license shall be part of the facility's air operating permit.

WAC-246-247(940131) 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.

WAC-246-247(940131) 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.

WAC-246-247(940131) Section 110(1)

Name and address of the facility, and location (latitude and longitude) of the emission unit(s).

WAC-246-247(940131) Section 110(2)

Name, title, address, and phone number of the responsible manager.

WAC-246-247(940131) Section 110(3)

Identify the type of proposed action for which this application is submitted:

(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.

WAC-246-247(940131) Section 110(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.

WAC-246-247(940131) Section 110(5)

Describe the chemical and physical processes upstream of the emission unit(s).

WAC-246-247(940131) Section 110(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 meters/sec for the emission unit(s).

WAC-246-247(940131) Section 110(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.

WAC-246-247(940131) Section 110(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.

WAC-246-247(940131) Section 110(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.

20.0 ENVIRONMENTAL PROTECTION

WAC-246-247(940131) Section 110(10)

Indicate the annual possession quantity for each radionuclide.

WAC-246-247(940131) Section 110(11)

Indicate the physical form of each radionuclide in inventory: Solid,particulate solids, liquid, or gas.

WAC-246-247(940131) Section 110(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.

WAC-246-247(940131) Section 110(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.

(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 emission data or emissions estimates.
In all cases, indicate whether the emission unit is operating in a batch or continuous mode.

WAC-246-247(940131) Section 110(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.

WAC-246-247(940131) Section 110(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.

WAC-246-247(940131) Section 110(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.

WAC-246-247(940131) Section 110(17)

Provide an estimate of the lifetime for the facility process with the emission rates provided in this application.

WAC-246-247(940131) Section 110(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 N131, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities

WAC-246-247(940131) Section 120, Appendix B

BARCT compliance demonstration. 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.

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. Technology Standards. The BARCT demonstration and the emission unit design and construction must meet, as applicable, the technology standards shown below if the units potential-to-emit exceeds 0.1 mrem/yr TEDE to the MEI. If the potential-to-emit is below this value, the standards must be met only to the extent justified by a cost/benefit evaluation. 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
The following standards and references are recommended as guidance only: ANSI/ASME NQA-2, Quality Assurance Requirements for Nuclear Facilities ANSI N42.18, Specification and Performance of On-site Instrumentation for Continuously Monitoring Radioactivity in Effluent

ERDA 76-21, Nuclear Air Cleaning Handbook
ACGIH 1988, Industrial Ventilation, A Manual of Recommended Practice, 20th ed., American Conference of Governmental Industrial Hygienists BARCT

Demonstration Procedure.

Step 1. Define facility process variables. Describe the physical and chemical process. Include the potential radionuclide release rates (by isotope, in units of curies/year), process variables (such as flow rate, temperature, humidity, chemical composition), and other technical considerations. Base the radionuclide release rate on the potential-to-emit.
Radionuclide selected for consideration in the BARCT demonstration shall include those which contribute more than ten percent of the potential TEDE to the MEI or more than 0.1 mrem/yr, and any others which the department determines are necessary.

Step 2. Gather information on all available control technologies. Search for all available technologies that can reduce the emissions levels for the radionuclides selected in Step 1. Sources of information shall include previous BARCT demonstrations, regulatory authorities, industry or regulatory agency data bases, literature searches, information from technology vendors, research and development reports, and any other means necessary to identify all available technologies. "Available technology" includes any technology that is commercially available. Recently completed searches may be used with department approval.

Step 3. Determine technical feasibility. Determine technical feasibility by evaluating vendor specifications for available control technologies identified in Step 2 with respect to the process variables identified in Step 1. Evaluate combinations of abatement technology and control devices by component, and the system as a whole. If a control technology has poor safety, reliability, or control effectiveness as achieved in practice under the proposed process conditions, or the technology is not applicable to the emission unit under consideration, the technology may be eliminated with supporting documentation of the technical infeasibility.

Step 4. List all feasible control technologies in order of effectiveness. Evaluate feasible control technologies for efficiency (effectiveness) in reducing the TEDE to the MEI. List them in order, with the most effective first. If the most effective feasible technology is proposed as BARCT, the demonstration is complete at this step.

Step 5. Evaluate the environment, energy, and economic impacts. Evaluate each control technology in succession, beginning with the most effective. Present an objective evaluation considering both beneficial and adverse impacts. Quantify the data where possible. Impact cost and effectiveness evaluations are incremental and include only that portion of the facility which comes under the authority of this chapter. Evaluate at least the following impacts: Environmental impact-Determine the incremental environmental impact, both beneficial and adverse. Evaluate the

20.0 ENVIRONMENTAL PROTECTION

beneficial impact of reduction in the TEDE to the surrounding population or, at a minimum, to the MEI due to the abatement of radioactive air emissions. Consider the adverse impacts from waste generation (radioactive and nonradioactive, air and nonair), disposal and stabilization, construction of control equipment, and the health and safety to both radiation workers and the general public. Energy impact-Determine the incremental energy impact. Include the impact. Include the impact of any resulting need for new services such as energy distribution systems.

Economic impact-Determine the incremental economic impact. Determine capital and expense costs including design, development, procurement, construction, operation, maintenance, taxes, waste, disposal, and any other applicable financial components. Base all costs on the expected lifetime of the emission unit and reduce to an annualized cost for evaluation and comparison. The most effective technology may be eliminated from consideration if the applicant can demonstrate to the department's satisfaction that the technology has unacceptable impacts. State clearly the basis for this conclusion and proceed to the next most effective control technology. If the next most effective technology is proposed as BARCT, the demonstration is complete; otherwise, evaluate the control technology for impacts in accordance with this step. If the control technology cannot be eliminated on the basis of its impacts, it is proposed as BARCT.

Reporting. Prepare a BARCT compliance demonstration report for department review. Provide sufficient information such that the department can validate essential results. If no control technology is feasible, and/or emissions are unacceptable, the department reserves the right to prohibit the construction and operation of the emission unit(s).

20.2.3 RCRA TSD Facility Permits

WAC-173-303 Section 281(2)

(2) Applicability. This section applies to owners/operators of proposed facilities. This section also applies to existing facilities for which the department receives an application for expansion. This section does not apply to owners/operators of facilities or portions of facilities who are applying for research, development and demonstration permits, pursuant to section 3005(g) of the Resource Conservation and Recovery Act, codified in 40 CFR Part 270.65. In addition, this section does not apply to owners/ operators of facilities operating under an emergency permit pursuant to WAC 173-303-804 or to persons at facilities conducting on-site cleanup of sites under the Comprehensive Environmental Response Compensation and Liability Act, Sections 3004(u), 3004(v), and 3008(h) of the Resource Conservation and Recovery Act, chapter 70.105 RCW, or chapter 70.105D RCW, provided the cleanup activities are being conducted under a consent decree, agreed order, or enforcement order, or is being conducted by the department or United States Environmental Protection Agency. As used in this section:

(a) "Proposed facility" means a facility which has not qualified for interim status under WAC 173-303-805 or for which the department has not issued a final facility permit under WAC 173-303-806 prior to the effective date of this section;

(b) "Existing facility" means a facility which has qualified for interim status under WAC 173-303-805 or for which the department has issued a final facility permit under WAC 173-303-806 prior to the effective date of this section; and

(c) "Expansion" means the enlargement of the land surface area of an existing facility from that described in an interim status permit application or final status permit, the addition of a new dangerous waste management process, or an increase in the overall design capacity of existing dangerous waste management processes at a facility.

WAC-173-303 Section 281(3)

(3) Notice of intent to file for an interim status or a dangerous waste permit.

(a) The notice of intent to be prepared by the owners/operators of the applicable facilities shall consist of:

(i) The name, address, and telephone number of the owner, operator, and corporate officers;

(ii) The location of the proposed facility or expansion on a topographic map with specifications as detailed in WAC 173-303-806 (4)(a)(xviii);

(iii) A brief description of the types and amounts of wastes to be managed annually;

(iv) A brief description of the major equipment items proposed, if any, and the waste management activities requiring a permit or revision of an

20.0 ENVIRONMENTAL PROTECTION

existing permit;

(v) Demonstration of compliance with the siting criteria as required under WAC 173-303-282 (6) and (7). The site conditions with regards to satisfying the criteria are to be assessed as of the date of submittal of the notice of intent to the department;

(vi) For informational purposes a complete summary of compliance violations of permit conditions at hazardous waste management facilities owned or operated by the applicant, its subsidiaries or its parent company, during the ten calendar years preceding the permit application. Along with the summary of compliance violations, as issued by appropriate state or federal regulatory agencies, the applicant shall also submit responses to past violations and any written correspondence with regulatory agencies regarding the compliance status of any hazardous waste management facility owned or operated by the applicant, its subsidiaries or parent company of the owner or operator. A more detailed compliance record must be provided upon request by the department;

(vii) For informational purposes the need for the proposed facility or expansion shall be demonstrated by one of the following methods:

(A) Current overall capacity within Washington is inadequate for dangerous wastes generated in Washington as determined by regional or state dangerous waste management plans; or

(B) The facility is a higher priority management method, as described in RCW 70.105.150, than is currently in place or practical and available for the types of waste proposed to be managed; or

(C) The facility will add to the types of technology available or will reduce cost impacts (not to include transportation costs) to Washington generators for disposal of dangerous wastes; and

(ix) For informational purposes it shall be shown how the capacity of the proposed facility or expansion will affect the overall capacity within the state, in conjunction with existing facilities in Washington.

(b) The notice of intent shall be filed with the department, and copies shall be made available for public review, no less than one hundred fifty days prior to filing an application for a permit or permit revision. Public notification of the notice of intent to file shall be given at the time of filing by announcement in a daily newspaper within the area of the proposed facility or expansion for a minimum of fourteen consecutive days. In addition, the department shall send a copy of the notice of intent to the elected officials of the lead local government and all local governments within the potentially affected area as required by WAC 173-303-902 (5)(b)(i). The department will continue to coordinate with interested local governments throughout the review of the proposal.

(c) Reserved.

20.3 Environmental Monitoring, Surveillance and Inspections

DOE/EH0173T Section 8.1.1

The requirements to be followed when calculating public radiation dose are listed in the summary. DOE programs for surface- and ground-water monitoring, reporting, and modeling are under consideration by the DOE Office of Environmental Guidance and Compliance; thus, few details on these subjects are provided in this guide. These requirements will be broad enough to define conditions for radionuclides and associated chemicals that could enter surface or ground waters. Except where mandated otherwise (e.g., compliance with 40 CFR Part 61), the assessment models selected for all environmental dose assessments should* appropriately characterize the physical and environmental situation encountered. The information used in dose assessments should* be as accurate and realistic as possible. Complete documentation of assessments of the radiation dose resulting from the operation of DOE-controlled facilities
should* be provided in a manner that supports the annual site environmental monitoring report, Environmental Monitoring Plan, or other application, and show the 1) models used, 2) computer programs used, and 3) input data and data source assumptions made.

DOE5400.1 Chapter IV, Section 3

Preoperational Monitoring of Facilities, Sites, and Operations. An environmental study shall be conducted prior to start up of a new site, facility, or process which has the potential for significant adverse environmental impact. The preoperational study should begin not less than 1

20.0 ENVIRONMENTAL PROTECTION

year, and preferably 2 years before start up to evaluate seasonal changes. The study shall serve to: characterize existing physical, chemical, and biological conditions that could be affected; establish background levels of radioactive and chemical components; characterize pertinent environmental and ecologic parameters; and identify potential pathways for human exposure or environmental impact as a basis for determining the nature and extent of the subsequent routine operational and emergency effluent monitoring and environmental surveillance programs. Where time and circumstances do not allow for completion of preoperational monitoring prior to start-up, it shall be conducted concurrent with work on the new site, facility, or process. The preoperational study shall be consistent with NEPA compliance activities. Where appropriate, activities and documentation conducted for NEPA compliance may substitute for compliance with this requirement.

DOE5400.1 Chapter IV, Section 5.b

Environmental Surveillance

(1) Environmental surveillance shall be conducted to monitor the effects, if any, of DOE activities on-site and offsite environmental and natural resources. An environmental surveillance screening program shall be undertaken at DOE sites to determine the need for a permanent surveillance program. Environmental surveillance shall be designed to satisfy one or more of the following program objectives:

(a) Verify compliance with applicable environmental laws and regulations;
(b) Verify compliance with environmental commitments made in Environmental Impact Statements, Environmental Assessments, Safety Analysis Reports, or other official DOE documents;
(c) Characterize and define trends in the physical, chemical and biological condition of environmental media;
(d) Establish baselines of environmental quality;
(e) Provide a continuing assessment of pollution abatement programs;
(f) Identify and quantify new or existing environmental quality problems.

DOE5400.5 Chapter II, Section 6.b(1)

Modeling. Analytical models used for dose evaluations shall be appropriate for characteristics of emissions (e.g., gas, liquid, or particle; depositing or non-depositing; buoyant or non-buoyant); mode of release (e.g., stack or vent; crib or pond; surface water or sewer; continuous or intermittent); environmental transport medium (e.g., air or water); and exposure pathway (e.g., inhalation; ingestion of food, water, or milk; direct radiation). Information on dispersion (transport and diffusion) in the environment, demography, land use (including the location and number of dairy and slaughter animals), food supplies, and exposure pathways used in the dose calculations shall be appropriate to evaluate actual and potential doses in the environs of DOE facilities. Such information shall be updated as necessary to document significant changes that could affect dose evaluations. Dose evaluation models that are codified, approved, or accepted by regulatory or other authorities shall be used where appropriate, such as the AIRDOS/RADRISK codes pursuant to 40 CFR Part 61, Subpart H.

DOE5484.1 Chapter III, Section 5.c(1)(a)

Monitoring Guidelines.

(1) General.

(a) 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.

DOE5484.1 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

20.0 ENVIRONMENTAL PROTECTION

specified in a discharge or operating permit.

DOE5484.1 Chapter III, Section 5.c(3)(a)

Type and Frequency of Sampling.
(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.

DOE5484.1 Chapter III, Section 5.c(3)(b)

For purposes of reporting radiological data, gross radioactivity measurements
are generally inadequate. They are appropriate only:

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.

20.3.1 Monitoring, Surveillance and Inspection Plans and Procedures

40CFR 122 Part 41(j)

Monitoring and records.

(1) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

(2) Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

(3) Records of monitoring information shall include:

(i) The date, exact place, and time of sampling or measurements;

(ii) The individual(s) who performed the sampling or measurements;

(iii) The date(s) analyses were performed;

(iv) The individual(s) who performed the analyses;

(v) The analytical techniques or methods used; and

(vi) The result of such analyses.

(4) Monitoring results must be conducted according to test procedures approved under 40 CFR part 136 or, in the case of sludge use or disposal,

20.0 ENVIRONMENTAL PROTECTION

approved under 40 CFR part 136 unless otherwise specified in 40 CFR part 503, unless other test procedures have been specified in the permit.

(5) The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If conviction of a person is for a violation committed after a first conviction of a person is for violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

40CFR 191 Part 1(a)

Radiation doses received by members of the public as a result of the management (except for transportation) and storage of spent nuclear fuel or high-level or transuranic radioactive wastes at any facility regulated by the Nuclear Regulatory Commission or by Agreement States, to the extent that such management and storage operations are not subject to the provisions of Part 190 of Title 40.

40CFR 191 Part 1(b)

Radiation doses received by members of the public as a result of the management and storage of spent nuclear fuel or high-level or transuranic wastes at any disposal facility that is operated by the Department of Energy and that is not regulated by the Commission or by Agreement States.

40CFR 191 Part 4(b)

An application for alternative standards shall be submitted as soon as possible after the Department determines that continued operation of a facility will exceed the levels specified in 191.03(b) and shall include all information necessary for the Administrator to make the determinations called for in 191.04(a).

40CFR 191 Part 4(c)

Requests for alternative standards shall be submitted to the Administrator, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, DC 20460.

40CFR 61 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 purpose of compliance.

DOE/EH0173T Section 10.3.1

Required written procedures covering monitoring activities include the following topics:

Environmental and effluent sampling

Ground-water sampling

Continuous environmental and effluent monitoring systems

Laboratory analysis

Data management and calculations

Transport and pathway modeling

Dose calculations

Review and reporting of results

20.0 ENVIRONMENTAL PROTECTION

DOE/EH0173T Section 2.0

All liquid effluent streams from DOE facilities should be evaluated and their potential for release of radionuclides assessed. This evaluation is required to adequately control such releases. The results of this assessment provide the basis for the facility's Effluent Monitoring Program (DOE 5400.5), which should be documented in the site Environmental Monitoring Plan (as described in DOE 5400.1), to show:

Effluent monitoring (sampling or in situ measurement) extraction locations used for providing quantitative effluent release data for each outfall;

Procedures and equipment used to perform the extraction and measurement;

Frequency and analysis required for each extraction (continuous monitoring and/or sampling location;

Minimum detection level and accuracy;

Quality assurance components;

Effluent outfall alarm settings and basis.

Liquid effluent from DOE-controlled facilities that have the potential for radioactive contamination should be monitored in accordance with the requirements of DOE 5400.1 and DOE 5400.5. As appropriate, component systems may be grouped and standard procedures referenced.

DOE/EH0173T Section 2.2, Sentence 1

The selection or modification of a liquid effluent monitoring system should be based on a careful characterization of the source(s), pollutant(s) (characteristics and quantities), sample-collection system(s), treatment system(s), and final release points(s) of the effluents.

DOE/EH0173T Section 2.2.1

For those effluent streams requiring continuous monitoring/sampling, all data received from the continuous monitoring system should be used when performing statistical analyses. In the case of discharge points releasing radionuclides emitting alpha or weak beta radiation, with no documentable ratios to beta and/or gamma emitters that could be used as indicator radionuclides (i.e., where it is not technologically feasible to monitor continuously), continuous proportional sampling and analysis can be used as an alternative to continuous monitoring. However, the consideration of new technologies to continuously monitor such effluent streams is encouraged.

DOE/EH0173T Section 2.2.2

Sampling systems should* be sufficient to collect representative samples that provide for an adequate record of releases from a facility, to predict trends, and to satisfy needs to quantify releases.

DOE/EH0173T Section 2.3.1

The following criteria should be considered when operating a liquid effluent sampling system:

Location of sampling and monitoring systems

Use of a pump in areas where necessary to provide a uniform continuous flow in the main sample line

A redundant sample-collection system or one of the following alternatives to permit continued sampling during replacement or servicing of the systems: 1) a substitute sample-transport system, 2) the capability to shut down the system for fast repair, or 3) an alternate method for estimating releases when the system is not capable of operating

Location of sample ports in liquid effluent lines sufficiently far downstream from the last feeder line to allow complete mixing (as complete as possible) of liquid and design of the sample port to allow intake of a proportional part of the liquid effluent stream

Capability to determine the effluent stream and sample-line flows within an accuracy of at least +/- 10% <percent>

20.0 ENVIRONMENTAL PROTECTION

Design of the system to minimize deformation and sedimentation and to prevent freezing of effluent sample lines.

DOE/EH0173T Section 2.3.3

The sampling ports should be 1) positioned downstream from the last component stream entering, in a location that will provide complete mixing; and 2) designed to accommodate a proportional amount of the full range of effluent flow for transport to the collection system. If proportionality cannot be automated, both the effluent and sample flow rates should be measured.

DOE/EH0173T Section 2.3.4

The integrity of the junction of the liquid-sample line with the sampling port is important. Liquid effluent lines can expand and contract considerably, depending on the thermal loading variation in the line(s). Consequently, design for such a junction should consider either line snubbers or special fabrications to handle the added mechanical stress.

DOE/EH0173T Section 2.3.5

Unless sufficiently high and constant hydraulic pressure exists within an effluent system, a sampling pump of high reliability should be installed Removal of the sample from the liquid effluent line where a sampling pump is required should be accomplished using a constant-volume pump that will maintain a constant flow, regardless of line pressure changes.

DOE/EH0173T Section 2.3.6

The design of the collector portion of the sampling system should allow for the collection of a sample that is consistent with the method of analysis. For example, if the effluent stream has a small flow, a small container might be used to obtain a grab sample that is counted directly in the laboratory. If concentration of the sample is necessary, a large-volume sample will be necessary. If the collection system requires measured aliquots taken sequentially every few minutes, then both the frequency and required sensitivity of analysis have an impact on the size of the container to be used. The sample line should be routed back to either the effluent line or a waste treatment system. Thus, location of the sample collection system can be based in part on the return flow of the sample line.

DOE/EH0173T Section 2.3.8

The external environment surrounding the sampling system and effluent lines must be considered. The sampling system should be protected from adverse environmental factors including unusual operational impacts. At sample collection points, the ambient dose rate originating in the effluent line(s) and the sampling apparatus should be evaluated for compliance with shielding and contamination control requirements necessary for reducing worker exposure. Components of the sampling system should be readily accessible for maintenance.

DOE/EH0173T Section 2.4

Design considerations for liquid effluent monitoring systems should include the purpose of the monitoring, the types and levels of expected radionuclides, potential background dose rates, expected duration of releases, and environmental effects. One of the primary purposes of using a monitoring system is to utilize its ability to provide a prompt signal if a significant release occurs. Thus, the output signal from monitoring systems should be continuously monitored by responsible personnel. In addition, written response procedures should be provided describing the action that responsible personnel must take if an abnormal signal is detected. The output signal
instrumentation, monitoring system recorders, and alarms should* be in a location that is continuously occupied by operations or security personnel.

DOE/EH0173T Section 2.4.5

Radioactive material in effluents occasionally originates from a fluctuating source(s). If the content and radioactivity concentration are constant but the release is of short duration, the effluent is considered a "batch" release. Before a batch is released, a representative grab sample should be drawn and analyzed to determine releasability. If the effluent originates from a continuing source(s), it is considered a "continuous" stream and should be continuously monitored and/or sampled.

DOE/EH0173T Section 2.5

To signal the need for corrective actions that may be necessary to prevent public or environmental exposures from exceeding the limits or recommendations given in DOE 5400.5, when continuous monitoring systems are required, they should* have alarms set to provide timely warnings. To prevent the cumulative impacts of small releases from producing a significant impact, routine grab, continuous, or proportional samples should be collected often enough to detect radionuclides of interest including those with relatively short halflives.

20.0 ENVIRONMENTAL PROTECTION

DOE/EH0173T Section 3.1, Paragraph 1, Sentences 2-4

The criteria listed in Table 3-1 are based on the projected effective dose equivalent in one year to a member of the public (in rem). Additional airborne emission requirements for DOE-controlled facilities that are required under DOE 5400.1 and DOE 5400.5 are given in the summary and discussed in this chapter. The monitoring effort should be commensurate with the importance of the sources during routine operation and from potential accidents with respect to their potential contribution to public dose or to contamination of the environment.

DOE/EH0173T Section 3.3, Sentences 1-4

The frequency requirements for airborne emission monitoring (continuous monitoring and/or sampling) programs are summarized in Table 3-1. Application of these criteria to an individual facility (DOE-controlled site) or source (DOE-controlled facility) requires that an adequate study of the expected releases, potential exposure pathways, and resulting dose be conducted. For all new facilities or facilities that have been modified in a manner that could affect effluent release quantity or quality or that could affect the sensitivity of monitoring or surveillance systems, a preoperational assessment should* be made and documented in the site Environmental Monitoring Plan to determine the types and quantities of airborne emissions to be expected from the facility, and to establish the associated airborne emission monitoring needs of the facility. The performance of the airborne emissions monitoring systems should* be sufficient for determining whether the releases of radioactive materials are within the limits or requirements specified in DOE 5400.5.

DOE/EH0173T Section 3.5.8.3

The following criteria are guidelines to be considered for monitors that measure specific radionuclides.

Tritium Monitors. ANSI N42.18-1974 (R 1980) specifies a minimum level of detectability (MLD) for tritium of 5E-6 micro-Curies per mL for continuous monitors used in gaseous effluent streams. IEC N.761-5 specifies a minimum level of detectability of 2E-6 micro-Curies per mL. The ANSI MLD is a 1974 minimum standard, and it specifies measurable concentrations at a 95% confidence level after 4 hours of sample concentration. However, the detectability level may not be obtainable with mixtures of radionuclides, and instrument response is limited by natural airborne radioactive materials (radon and thoron in equilibrium with their decay products). Additional concerns that should be considered in instrument design for tritium monitors based on the IEC standard (IEC N.761-5) are as follows:

Temperature control during sample transport to prevent condensation (much of the tritium may be in the form of airborne water vapor); and

Trapping or retention of water by a filter or sorbent (since much tritium is commonly in the form of HTO).

Radioiodine Monitors. Iodine cartridges used to collect radioiodine may be monitored at the collection point with a shielded detector, usually a single-channel thallium activated sodium iodide [NaI(Tl)] detector. Typical systems have one or more charcoal cartridges in a series, preceded by an absolute particulate filter. In-line measurements of low concentrations of radioiodine in air will usually not be feasible because of the presence of other radionuclides or radiation fields. Iodine cartridges must be replaced
at least weekly and the measurements verified by laboratory counting (DOE/EP-0096. Minimum levels of detectability for various iodine isotopes for continuous monitors of gaseous effluents must be established for a site, considering state of the art monitoring capabilities. The same general specifications given in the preceding discussion of tritium monitors, based on the IEC standard, should be considered for iodine monitors.

DOE/EH0173T Section 8.4

Emission or effluent data and data from estimates of atmospheric, surface-water, and ground-water radionuclide concentrations are used as input to environmental pathway analysis models. These models predict the environmental transport of radionuclides in the human environment. For most facilities and environmental media, the concentrations in the environment are too low to adequately measure; thus, modeling is used to predict values. A summary of the major environmental radiation exposure and transport pathways relevant to operating DOE facilities that should be considered is given in Figure 8-2. In this figure, processes or steps that are typically modeled are shown in boxes. Processes or steps that can be either modeled or obtained from monitoring data are shown in hexagons. A more complete listing of the potential individual pathways that should be considered in environmental pathway modeling is given in Table 8-1. Pathway analysis and transport models should be compared or calibrated with field data when such information is available. To assess the operational releases from nuclear facilities, NRC Regulatory Guide 1.109 (NRC 1977) provides terrestrial food chain transport models that address most of the steps shown in Figure 8-2. These models were adapted from the HERMES model (Soldat and Harr 1971) and are representative of the types of models that are frequently used (Hoffman and Baes 1979; Hoffman et al. 1977; IAEA 1982; Moore et al. 1979; NCRP Report No. 76; NUREG/CR-3332, Whelan et al. 1987; Napier et al. 1988; Gilbert et al. 1989; Droppo et al. 1989).

20.0 ENVIRONMENTAL PROTECTION

DOE5400.1 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.

DOE5400.1 Chapter IV, Section 5.a

Effluent Monitoring

(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.

DOE5400.1 Chapter IV, Section 5.a(2)

(2)Effluent monitoring shall comply with applicable regulations and shall be conducted to provide representative measurements of the quantities and concentrations of pollutants in liquid and airborne discharges, and solid wastes.

(a) Monitoring Stations. Effluents from on-site waste treatment or disposal systems shall be monitored in accordance with applicable regulations. Influents 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.

DOE5400.1 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.

DOE5400.1 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.

20.0 ENVIRONMENTAL PROTECTION

DOE5400.1 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.

DOE5400.1 Chapter IV, Section 8.d(1)

Water Monitoring - Environmental Surveillance

(1) Ambient water quality monitoring should be conducted through a network of fixed stations from which data will establish well-defined histories of the physical, biological, and chemical conditions of local bodies of water and sediments.. The data obtained from this network should be coordinated with other monitoring activities. Water quality data may be obtained from existing State and local monitoring stations.

DOE5400.1 Chapter IV, Section 8.d(3)

Monitoring networks should be operated and maintained in a uniform manner, i.e., through established procedures that allow comparative evaluations of data from monitoring sites. Receiving water characteristics will determine the location of stations. A reconnaissance survey might be sufficient in sitting stations. Under complex circumstances, mathematical models could be needed to select stations sites.

DOE5400.1 Chapter IV, Section 8.d(4)

Monitoring programs are best served by fixed station networks. However, a network of effluent monitoring and selected mobile monitoring stations could satisfy the needs at some facilities.

DOE5400.1 Chapter IV, Section 8.d(5)

Surface water sampling performed at fixed monitoring stations will characterize physical and chemical properties of the water column and\sediments, and biological species in the water column and benthos. Types of sampling performed should depend upon local conditions and the variability of stream characteristics and water quality.

DOE5400.1 Chapter IV, Section 8.d(6)

The monitoring frequency at a fixed network station is a function of the variability of the chemical, physical, and biological conditions of the water body. Data collected shall be representative of the variations in water quality and changes in pollutant loads. Varying sampling frequencies could be required to accurately reflect seasonal changes, variable pollution sources, time of water travel between stations, and tidal and diurnal variations.

DOE5400.1 Chapter IV, Section 8.d(7)

Ambient water quality monitoring serves to confirm compliance with the Clean Water Act. An understanding of the Water Quality Management (WQM) process implemented by EPA, the States, interstate agencies, and area-wide, local and Regional planning organizations is essential to the design of a water quality monitoring program. The elements of the WQM processes are described in 40 CFR Part 130. Test procedures for pollutant analyses are listed in the 40 CFR Part 136.

DOE5484.1 Chapter III, Section 4.a

Scope and Content of Environmental Monitoring Program, Reports, and Summaries. Environmental Monitoring. Programs for monitoring the environment shall be conducted at Department of Energy sites to determine:

(1) Compliance with the requirements of Order DOE 5480.1, Chapters I, XI, and XII.

(2) The background levels and site contribution of radioactivity; and, as appropriate, other pollutants, in the site environs.

(3) Compliance with applicable environmental quality and public exposure limits and other environmental commitments (e.g., those published in environmental impact statements or other official documents).

LAPCA-REG1 Article 5, Section 5.02

A. For areas within the jurisdiction where burning is allowed, the Authority will make daily "burn" or "no-burn" designations based on current monitoring and meteorological data. This information will be provided daily on a published burn-message phone line, and/or through the local

20.0 ENVIRONMENTAL PROTECTION

media.

B. A person burning under this section must follow these requirements and restrictions:

1. Unless otherwise specified, on "burn days" open burning may be conducted in areas where open burning is allowed only between the hours of 9 a.m. and one hour before Sunset.
2. The fire must not include the following materials: garbage, dead animals, asphalt, petroleum products, paints, rubber products, plastics, paper (other than what is necessary to start a fire), cardboard, treated wood, construction debris, metal or any substance (other than natural vegetation) which when burned releases toxic emissions, dense smoke, or odors.
3. A person capable of extinguishing the fire must attend it at all times and the fire must be extinguished before leaving it.
4. No fires are to be within fifty feet of structures.
5. The pile must not be larger than four feet by four feet by three feet.
6. Only one pile at a time may be burned, and each pile must be extinguished before lighting another.
7. No outdoor fire is permitted in or within 500 feet or forest slash.
8. If the fire creates a nuisance, it must be extinguished.
9. Permission from the landowner or the landowner's designated representative must be obtained before starting an open fire.

C. No open burning shall be allowed on construction or demolition sites.

D. Special burning permits

1. No building, structure, or vessel may be demolished by intentional burning, either for demolition or for fire training, without a written approval, in the form of a special burning permit, from the Authority. The special permit will contain restrictions regarding prohibited materials, fire safety, asbestos removal or demolition, and other restrictions as deemed necessary. Special burn permits shall be subject to a fee as described in Section 10.09.
2. No burning of large quantities of unprocessed or processed natural vegetation accumulated from land clearing or other activities or events is allowed except by written special permit from the Authority. Special burning permits will specify restrictions and conditions on a case by case basis. Special burning permits shall be subject to a fee as described in Section 10.09. Agricultural burning as defined in 173-430-020 on commercially viable agricultural enterprises is exempted.
3. When anyone under the jurisdiction of this Authority would like to apply for a special burning permit to allow them to perform an operation or procedure otherwise not granted under this Article, they may submit a Request for Special Burning Permit (RSBP) at least five (5) working days prior to the proposed activity to the Authority with an application fee as described in Article 10, Section 10.09. Payment of the fee shall not guarantee the applicant that the request will be approved. The RSBP must include the name, address, and phone number of the applicant, a detailed explanation of the requested special permit, purpose of the special permit, and how the applicant would incur hardship without the special permit.

WAC-173-401 Section 615(1)

Monitoring and related recordkeeping and reporting requirements.
Monitoring. Each permit shall contain the following requirements with respect to monitoring:

(a) All emissions monitoring and analysis procedures or test methods required under the applicable requirements, including any procedures and methods promulgated pursuant to sections 504(b) or 114 (a)(3) of the FCAA;

(b) Where the applicable requirement does not require periodic testing or instrumental or noninstrumental monitoring (which may consist of recordkeeping designed to serve as monitoring), periodic monitoring sufficient to yield reliable data from the relevant time period that are representative of the source's compliance with the permit, as reported pursuant to subsection (3) of this section. Such monitoring requirements shall assure use of terms, test methods, units, averaging periods, and other statistical conventions consistent with the applicable requirement. Recordkeeping provisions may be sufficient to meet the requirements of this paragraph; and

(c) As necessary, requirements concerning the use, maintenance, and, where appropriate, installation of monitoring equipment or methods.

20.0 ENVIRONMENTAL PROTECTION

WAC-246-247(940131) Section 075(1)

All radioactive air emissions monitoring, testing, and quality assurance 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 referenced subparts.

WAC-246-247(940131) 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 N131, 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.

WAC-246-247(940131) 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.

WAC-246-247(940131) Section 075(4)

The department may allow a facility to use alternative monitoring procedures or methods if continuous monitoring is not a feasible or reasonable requirement.

WAC-246-247(940131) 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.

WAC-246-247(940131) Section 075(7)

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.

WAC-246-247(940131) Section 075(8)

Facilities shall monitor nonpoint and fugitive emissions of radioactive material.

WAC-246-247(940131) Section 075(9)

The department may conduct an environmental surveillance program to ensure that radiation doses to the public from emission units are in compliance with applicable standards. The department may require the operator of any emission unit to conduct stack sampling, ambient air monitoring, or other testing as necessary to demonstrate compliance with the standards in WAC 246-247-040.

WAC-246-247(940131) Section 075(10)

The department may require the owner or operator of an emission unit to make provision, at existing emission unit sampling stations, for the department to take split or collocated samples of the emissions.

WAC-246-247(940131) 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.

WAC-246-247(940131) Section 075(13)

All facilities must be able to demonstrate the reliability and accuracy of the radioactive air emissions monitoring data.

WAC-246-247(940131) Section 080(7)

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.

20.0 ENVIRONMENTAL PROTECTION

WAC-246-247(940131) 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.

WAC-246-247(940131) 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.

WAR-10-000F Part IV Introduction

A storm water pollution prevention plan shall be developed for each construction site covered by this permit. Storm water pollution prevention plans shall be prepared in accordance with good engineering practices. The plan shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges from the construction site. In addition, the plan shall describe and ensure the implementation of practices which will be used to reduce the pollutants in storm water discharges associated with industrial activity at the construction site to assure compliance with the terms and conditions of this permit. Facilities must implement the provisions of the storm water pollution prevention plan required under this part as a condition of this permit.

WAR-00-000F Part IV Introduction

A storm water pollution prevention plan shall be developed for each facility covered by this permit. Storm water pollution prevention plans shall be prepared in accordance with good engineering practices and in accordance with the factors outlinded in 40 CFR 125.3(d)(2) or (3) as appropriate. The plan shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with industrial activity from the facility. In addition, the plan shall describe and ensure the implementation of practices which are to be used to reduce the pollutants in storm water discharges associated with industrial activity at the facility and to assure compliance with the terms and conditions of this permit. Facilities must implement the provisions of the storm water pollution prevention plan required under this part as a condition of this permit.

20.3.2 Quality Assurance

DOE/EH0173T Section 10.3.2

Each site is required to maintain an analytical QC program adequate to document and control the accuracy and precision of the analytical results. If analytical work is performed by a subcontractor, the subcontractor is required to meet the same QC requirements. Guidance on content of analytical QC programs is provided by Belanger (1984), Goldin (1970), Rosenstein and Goldin (1964), EPA-600/9-76-005, EPA-600/7-77-088, EPA-600/8-78-008, and EPA-600/4- 79-019.

DOE 5400.5 requires that all organizations performing effluent or environmental monitoring participate in the DOE quality assessment program for those nuclides and media that they regularly measure. Samples are distributed by the Environmental Measurements Laboratory (EML) twice a year, and participants analyze both sets of samples. DOE monitoring organizations should participate in other interlaboratory QC programs such as the EPA Environmental Radioactivity Laboratory Intercomparison Studies Program (EPA- 600/4-78-032).

Radiation measuring equipment, including portable instruments, environmental dosimeters, in situ monitoring equipment, and laboratory instruments, should* be calibrated with standards traceable to NIST calibration standards (NCRP 1978; National Bureau of Standards Special Publication 609).

DOE/EH0173T Section 2.2.3

Continuous monitoring and sampling systems should* be calibrated before use and recalibrated any time they are subject to maintenance, modification, or system changes that may affect equipment calibration. In addition they should* be recalibrated at least annually and routinely checked with known sources to determine that they are consistently functioning properly. Calibration(s) should be performed in a manner consistent with manufacturers' instructions and specifications. Each system should be checked on a routine basis, at least weekly. Sampling systems should be functioning properly before a facility is placed in operation. The use of redundant sampling systems may be necessary to provide adequate sampling capabilities and prevent delays in process operation.

20.0 ENVIRONMENTAL PROTECTION

DOE/EH0173T Section 2.2.4

Environmental conditions (e.g., temperature, humidity, radiation level, dusts, and vapors) should* be considered when locating sampling and monitoring systems to avoid conditions that will influence the operation of the system. Off-line liquid transporting lines should* be replaced if they become contaminated (to the point where the sensitivity of the system is affected) with radioactive materials or if they become ineffective in meeting the design basis within the established accuracy/confidence levels.

DOE/EH0173T Section 2.6

As they apply to the monitoring/sampling of liquid effluents, the general quality assurance program provisions of Chapter 10 should* be followed. Specific quality assurance requirements for the facility's liquid effluent monitoring program are to be contained in the Quality Assurance Plan associated with the facility.

DOE5400.1 Chapter IV, Section 5.a(2)(d)

Monitoring Data Recordkeeping. Auditable records shall be established in accordance with the requirements of DOE 5700.6C QUALITY ASSURANCE.

DOE5400.1 Chapter IV, Section 10.a

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.

20.4.1 Water Quality

DOE5400.5 Chapter II, Section 1(d)

d. Drinking Water Pathway Only, All DOE Sources of Radionuclides. It is the policy of DOE to provide a level of protection for persons consuming water from a public drinking water supply operated by the DOE, either directly or through a DOE contractor, that is equivalent to that provided to the public by the public community drinking water standards of 40 CFR Part 141. These systems shall not cause persons consuming the water to receive an effective dose equivalent greater than 4 mrem (0.04 mSv) in a year. Combined radium-226 and radium-228 shall not exceed 5x10-9 micro Ci/ml and gross alpha activity (including radium-226 but excluding radon and uranium) shall not exceed 1.5x10-8 micro Ci/ml.

(1) DOE Drinking Water Systems. The dose limit is consistent with the drinking water criteria in 40 CFR Part 141, "National Interim Primary Drinking Water Regulations (Safe Drinking Water Act)."

(2) Dose Components. The dose limit is the effective dose equivalent to individuals whose exclusive source of drinking water contains a radionuclide, or a mixture of radionuclides, at a monthly average level of four percent of the appropriate DCG value. For simplicity, it is assumed that site workers are also exposed to four percent of DCG values or the radium and gross alpha levels in II.1d for drinking water while away from the DOE site.

(3) Impact on Other Systems. The liquid effluents from DOE activities shall not cause private or public drinking water systems downstream of the facility discharge to exceed the drinking water radiological limits in 40 CFR Part 141.

20.0 ENVIRONMENTAL PROTECTION

WAC-173-216 Section 110(1)

Permit terms and conditions.
Any permit issued by the department shall specify conditions necessary to prevent and control waste discharges into the waters of the state, including the following, whenever applicable:

(a) All known, available, and reasonable methods of prevention, control, and treatment;

(b) Pretreatment requirements;

(c) Requirements pursuant to other laws, including the state's Hazardous Waste Disposal Act, chapter 70.105 RCW, the Solid waste management -- Recovery and recycling, chapter 70.95 RCW, the Resource Conservation and Recovery Act of 1976, Public Law 95.190 or any other applicable local ordinances, state, or federal statute, to the extent that they pertain to the prevention or control of waste discharges into the waters of the state;

(d) Any conditions necessary to meet applicable water quality standards for surface waters or to preserve or protect beneficial uses for ground waters;

(e) Requirements necessary to avoid conflict with a plan approved pursuant to section 208(b) of FWPCA;

(f) Any conditions necessary to prevent and control pollutant discharges from plant site runoff, spillage or leaks, sludge or waste disposal, or raw material storage;

(g) Any appropriate monitoring, reporting and recordkeeping requirements as specified by the department, including applicable requirements under sections 307 and 308 of FWPCA;

(h) Schedules of compliance, including those required under sections 301 and 307 of FWPCA, which shall set forth the shortest reasonable time period to achieve the specified requirements; and

(i) Prohibited discharge requirements as contained in WAC 173-216-060.

WAC-246-290 Section 310(8)

(b) The MCLs for radium-226, radium-228, and gross alpha particle radioactivity are as follows:

Radium-226	3 pCi/L
Combined Radium-226 and Radium-228	5 pCi/L
Gross alpha particle activity (excluding uranium)	15 pCi/L

(c) The MCL for beta and photon radioactivity from man-made radionuclides is that the average annual concentration shall not produce an annual dose equivalent to the whole body or any internal organ greater than four millirem/year.

Compliance with the four millirem/year dose limitation may be assumed if the average annual concentration for gross beta activity, tritium, and strontium-90 are less than 50 pCi/L, 20,000 pCi/L, and 8 pCi/L respectively, provided that if both radionuclides are present, the sum of their annual dose equivalents to bone marrow shall not exceed four millirem/year.

20.0 ENVIRONMENTAL PROTECTION

20.4.2 Air Quality

42USC7671 Section d(a)

Restriction of Use of Class II Substances.-Effective January 1, 2015, it shall be unlawful for any person to introduce into interstate commerce or use any class II substance unless such substance:
(1) has been used, recovered, and recycled;
(2) is used and entirely consumed (except for trace quantities) in the production of other chemicals; or
(3) is used as a refrigerant in appliances manufactured prior to January 1, 2020. As used in this subsection, the term 'refrigerant; means any class II substance used for heat transfer in a refrigerating system.

42USC7671 Section g(c)(1)

Effective July 1, 1992, it shall be unlawful for any person, in the course of maintaining, servicing, repairing, or disposing of an appliance or industrial process refrigeration, to knowingly vent or otherwise knowingly release or dispose of any class I or class II substance used as refrigerant in such appliance (or industrial process refrigeration) in a manner which permits such substance to enter the environment. De minimis releases associated with good faith attempts to recapture and recycle or safely dispose of any such substance shall not be subject to the prohibition set forth in the preceding sentence.

42USC7671 Section g(c)(2)

Effective 5 years after the enactment of the Clean Air Act Amendments of 1990, paragraph (1) shall also apply to the venting, release, or disposal of any substitute substance for a class I of class II substance by any person maintaining, servicing, repairing, or disposing of an appliance or industrial process refrigeration which contains and uses as a refrigerant any such substance, unless the Administrator determines that venting, releasing, or disposing of such substance does not pose a threat to the environment. For purposes of this paragraph, the term 'appliance' includes any device which contains and uses as a refrigerant a substitute substance and which is used for household or commercial purposes, including any air conditioner, refrigerator, chiller, or freezer.

42USC7671 Section j(b)

Containers Containing Class I or Class II Substances and Products Containing Class I Substances.-Effective 30 months after the enactment of the Clean Air Act Amendments of 1990, no container in which a class I of class II substance is stored or transported, and no product containing a class i substance, shall be introduced into interstate commerce unless it bears a clearly legible and conspicuous label stating:
"Warning: Contains [insert name of substance], a substance which harms public health and environment by destroying ozone in the upper atmosphere."

42USC7671 Section j(c)(1)

After 30 months after the enactment of the Clean Air Act Amendments of 1990, and before January 1, 2015, no product containing a class II substance shall be introduced into interstate commerce unless it bears the label referred to in subsection (b) if the Administrator determines, after notice and opportunity for public comment, that there are substitute products or manufacturing processes (A) that do not rely on the use of such class II substance, (B) that reduce the overall risk to human health and the environment, and (c) that are currently or potentially available.

DOE5400.1 Chapter IV, Section 8.a(1)

Non-Radiological Monitoring - Air Monitoring - Emissions

(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.

DOE5400.1 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).

20.0 ENVIRONMENTAL PROTECTION

WAC-173-400 Section 040 General

General standards for maximum emissions.

All sources and emissions units are required to meet the emission standards of this chapter. Where 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.

WAC-173-400 Section 040(1)

(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).

WAC-173-400 Section 040(2)

(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.

WAC-173-400 Section 040(3)

(3) 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.

WAC-173-400 Section 040(4)

(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.

20.0 ENVIRONMENTAL PROTECTION

WAC-173-400 Section 040(5)

(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.

WAC-173-400 Section 040(6)

(6) Sulfur dioxide.

No person shall cause or permit the emission of a gas containing sulfur dioxide from any emissions unit in excess of one thousand ppm of sulfur dioxide on a dry basis, corrected to seven percent oxygen for combustion sources, and based on the average of any period of sixty consecutive minutes, except:

When the owner or operator of an emissions unit supplies emission data and can demonstrate to ecology or the authority that there is no feasible method of reducing the concentration to less than one thousand ppm (on a dry basis, corrected to seven percent oxygen for combustion sources) and that the state and federal ambient air quality standards for sulfur dioxide will not be exceeded. In such cases, ecology or the authority may require specific ambient air monitoring stations be established, operated, and maintained by the owner or operator at mutually approved locations. All sampling results will be made available upon request and a monthly summary will be submitted to ecology or the authority.

WAC-173-400 Section 040(7)

(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.

WAC-173-400 Section 040(8)

(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).

WAC-173-401 Section 605(1)

Emission standards and limitations.
General. Each permit shall contain emission limitations and standards, including those operational requirements and limitations that assure compliance with all applicable requirements at the time of permit issuance.

WAC-173-401 Section 605(2)

Alternative emission limits. If the Washington state implementation plan allows a determination of an alternative emission limit at a chapter 401 source, equivalent to that contained in the plan, to be made in the permit issuance, renewal, or significant modification process, the permitting authority may elect to use such process. Any permit containing such equivalency determination shall contain provisions to ensure that any resulting emissions limit has been demonstrated to be quantifiable, accountable, enforceable, and based on replicable procedures.

WAC-173-470 Section 110

Particle fallout shall not exceed the standards enumerated in the regulation. In recognition of natural dust in areas of the state, exceptions are provided
for areas east of the Cascade range crest.

20.0 ENVIRONMENTAL PROTECTION

20.4.3 Radiological Effluents

40CFR 61 Part 93(b)(4)

Emission Monitoring and Test Procedures

(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 purpose 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 facility
operations were otherwise normal.

DOE5400.5 Chapter II Section 1(a)

DOE Public Dose Limit–All Exposure Modes, All DOE Sources of Radiation.
Except as provided by 11.1a(4), (of this order) the exposure of members of the public to radiation sources as a consequence of all routine DOE activities shall not cause, in a year, an effective dose equivalent greater than 100 mrem (1mSv). Dose evaluations should reflect realistic exposure conditions (see II.6b (of this order)).

(1) Dose Components. The limit of 100 mrem (1 mSv) effective dose equivalent in a year specified in Para. II.1a of this order is the sum of the effective dose equivalent (or deep dose equivalent, if dosimeter data are used) from exposures to radiation sources external to the body during the year plus the committed effective dose equivalent from radionuclides taken into the body during the year.

(2) Exposure Modes. Other than for sources specifically excepted, doses to members of the public from all exposure modes that could contribute significantly to the total dose shall be considered for evaluation. Requirements and methods for performing the evaluations are discussed in Para. II.6 (of this order).

(3) Application. The public dose limits in Para. II.1a (of this order) apply to doses from exposures to radiation sources from routine activities, including remedial actions and naturally occurring radionuclides released by DOE processes and operations. The dose limits also apply to the doses to individuals who are exposed to radiation or contamination by radionuclides at properties subsequent to remedial actin and release of the property. Limits for radon and its decay products in air are provided in terms of Working Levels and concentrations in air and are addressed independently (Ch. IV and Fig. III-1 (of this order)). In addition, DOE operators are required to report DOE-related effective dose equivalent contributions of 10 mrem (0.10mSv) or more in a year (see Para. II.7 (of this order)).

DOE5400.5 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.

DOE5400.5 Chapter IV, Section 4.d

Surface Contamination. The generic surface contamination guidelines provided in Figure IV-1 are applicable to existing structures and equipment. These guidelines are generally consistent with standards of the NRC (NRC 1982) and functionally equivalent to Section 4, "Decontamination for Release for Unrestricted Use," of Regulatory Guide 1.86, but apply to nonreactor facilities. These limits apply to both interior equipment and building components that are potentially salvageable or recoverable scrap. If a building is demolished, the guidelines in paragraph IV.6a are applicable to the resulting contamination in the ground.

20.0 ENVIRONMENTAL PROTECTION

DOE5400.5 Chapter IV, Section 4.e

Residual Radionuclides in Air and Water. Residual concentrations of radionuclides in air and water shall be controlled to the required levels shown in paragraph II.1a and as required by other applicable Federal and/or State laws.

20.4.3.1 Liquid Radiological Effluents

DOE5400.5 Chapter II, Section 3.b(2)

Prohibition of New or Increased Discharge Quantities and New Soil Columns.
Except as permitted by the provisions in Chapter II, 3.e.(1), new or increased discharges of radionuclides in liquid waste to active soil columns and virgin soil columns shall be prohibited after the effective date of this Order.

DOE5400.5 Chapter II, Section 3.c(2)

Discharge of Other Liquids. Liquid discharges, even though uncontaminated, are prohibited in inactive release areas to prevent the further spread of radionuclides previously deposited.

DOE5400.5 Chapter IV, Section 6.b(3)

Controls shall be designated such that concentrations of radionuclides in the groundwater and quantities of residual radioactive material will not exceed applicable Federal or State standards.

20.4.3.2 Radionuclide Emissions

40CFR 61 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 10m rem/yr.

DOE5400.5 Chapter II, Section 1(b)

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 limitsfor DOE radium storage and disposal facilities (Chapter IV) and DOE inactive uranium mill tailings sites regulated under40 CFR Part 192.

(2) AIRDOS/RADRISK 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/RADRISK 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.

(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.

DOE5400.5 Chapter II, Section 1.b(1)

Title 40 CFR Part 61. The public dose limits as outlined in Chapter II, 1.b. 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.

20.0 ENVIRONMENTAL PROTECTION

WAC-246-247(940131) Section 040(1)

Standards for radioactive air emissions in the state of Washington are contained in WAC 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).

WAC-246-247(940131) 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).

WAC-246-247(940131) Section 040(4)

All existing emission units and nonsignificant modifications shall utilize ALARACT (see Appendix C).

20.5 Pollution Prevention

42USC13106 Section 6607

Source Reduction and Recycling Data Collection.

(a) Reporting Requirements.--Each owner or operator of a facility required to file an annual toxic chemical release form under section 313 of the Superfund Amendments and Reauthorization Act of 1986 ("SARA") for any toxic chemical shall include with each such annual filing a toxic chemical source reduction and recycling report for the preceding calendar year. The toxic chemical source reduction and recycling report shall cover each toxic chemical required to be reported in the annual toxic chemical release form filed by the owner or operator under section 313(c) of that Act. This section shall take effect with the annual report filed under section 313 for the first full calendar year beginning after the enactment of this subtitle.

(b) Items Included in Report.--The toxic chemical source reduction and recycling report required under subsection (a) shall set forth each of the following on a facility-by-facility basis for each toxic chemical:

(1) The quantity of the chemical entering any waste stream (or otherwise released into the environment) prior to recycling, treatment, or disposal during the calendar year for which the report is filed and the percentage change from the previous year. The quantity reported shall not include any amount reported under paragraph (7). When actual measurements of the quantity of a toxic chemical entering the waste streams are not readily available, reasonable estimates should be made on best engineering judgment.

(2) The amount of the chemical from the facility which is recycled (at the facility or elsewhere) during such calendar year, the percentage change from the previous year, and the process of recycling used.

(3) The source reduction practices used with respect to that chemical during such year at the facility. Such practices shall be reported in accordance with the following categories unless the Administrator finds other categories to be more appropriate.

(A) Equipment, technology, process, or procedure modifications.

(B) Reformulation or redesign of products.

(C) Substitution of raw materials.

(D) Improvement in management, training, inventory control, materials handling, or other general operational phases of industrial facilities.

(4) The amount expected to be reported under paragraph (1) and (2) for the two calendar years immediately following the calendar year for which the report is filed. Such amount shall be expressed as a percentage change from the amount reported in paragraphs (1) and (2).

(5) A ratio of production in the reporting year to production in the previous year. The ratio should be calculated to most closely reflect all activities involving the toxic chemical. In specific industrial classifications subject to this section, where a feedstock or some variable other than production is the primary influence on waste characteristics or volumes, the report may provide an index based on that primary variable for each toxic chemical. The Administrator is encouraged to develop production indexes to accommodate individual industries for use on a voluntary basis.

(6) The techniques which were used to identify source reduction opportunities. Techniques listed should include, but are not limited to, employee recommendations, external and internal audits, participative team management, and material balance audits. Each type of source reduction listed under paragraph (3) should be associated with the techniques or multiples of techniques used to identify the source reduction technique.

(7) The amount of any toxic chemical released into the environment which resulted from a catastrophic event, remedial action, or other one time event, and is not associated with production processes during the reporting year.

(8) The amount of the chemical from the facility which is treated (at the facility or elsewhere) during such calendar year and the percentage change from the previous year. For the first year of reporting under this subsection, comparison with the previous year is required only to the

20.0 ENVIRONMENTAL PROTECTION

extent such information is available.
(c) SARA Provisions.– The provisions of sections 322, 325(c), and 326 of the Superfund Amendments and Reauthorization Act of 1986 shall apply to the reporting requirements of this section in the same manner as to the reports required under section 313 of that Act. The Administrator may modify the form required for purposes of reporting information under section 313 of that Act to the extent he deems necessary to include the additional information required under this section.
(d) Additional Optional Information.–Any person filing a report under this section for any year may include with the report additional information regarding source reduction, recycling, and other pollution control techniques in earlier years.
(e) Availability of Data.–Subject to section 322 of the Superfund Amendments and Reauthorization Act of 1986, the Administrator shall make data collected under this section publicly available in the same manner as the data collected under section 313 of the Superfund Amendments and Reauthorization Act of 1986.

DOE5820.2A Chapter III, Section 3.c(1)

Waste Generation

(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 include consideration of process modification, process optimization, materials substitution and decontamination.

DOE5820.2A 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.

DOE5820.2A 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.

DOE5820.2A 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.

WAC-173-307 Section 030 WAC Plans Part (1)

(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 measure appropiate to the industry or activity;

(d) A general overview or the processes used in production or service activities (a schematic 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 4 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.

WAC-173-307 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, and 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 actural 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 fo 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, or hazardous waste generated and products containing hazardous substances used up to these threshold levels:

(A) All dangerous waste streams five hundered 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 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 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 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 or products containing hazardous substances, information obtained from the department, and information other wise known by the facility owner or operator.

(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 may identify the types and amounts, in either wight or volume, or hazardous waste generated and hazardous substances used up to the following threshold levels;

(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 500 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 then 95 percent of the total hazardous wastes generated, then additional dangerous wastes generated at the facility shall be included until 95 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 95 percent of all the hazardous waste generated; and

95 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) or 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.

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 substance 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 the 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 seed 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 rejection them shall be stated.

20.0 ENVIRONMENTAL PROTECTION

(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 contain 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 is practicable. Goals shall be set for a 5 year period from the first reporting date (see(h) of this subsection regarding implementation activities that will take longer than 5 years);

WAC-173-307 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 options to the extent reasonable 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 estimated and factored into this accounting system.

WAC-173-307 Section 030 WAC Plans Part (4)

Part four of the plan shall include a description of personnel training and employee involvement programs. Each facility required to write a plan is encouraged to advise its employees of the planning process and solicit comments on hazardous substance use and waste reduction options.

20.6 Contingency Planning

WAC-173-303 Section 145

Spills and discharges into the environment

145 (1) Purpose and applicability. This section sets forth the requirements for any person responsible for a spill or discharge, except when such release is otherwise permitted under state or federal law. For the purposes of complying with this section, a transporter who spills or discharges dangerous waste or hazardous substances during transportation will be considered the responsible person. This section shall apply when any dangerous waste or hazardous substance is intentionally or accidentally spilled or discharged (unless otherwise permitted), regardless of the quantity of dangerous waste or hazardous substance.

145 (2) Notification. Any person who is responsible for a nonpermitted spill or discharge shall immediately notify the individuals and authorities described for the following situations:

145 (2) (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; and

145 (2) (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

20.0 ENVIRONMENTAL PROTECTION

the appropriate regional office of the department of ecology.

(145) (2) (d) In lieu of notification under (c) of this subsection, for spills or discharges below ten gallons occurring and contained in secondary containment meeting the requirements of this chapter, a brief account must immediately be entered into the operating record, for a TSD facility, or into the inspection log or separate spill log, for a generator. This account must include: The time and date of the spill; the location and cause of the spill; the type and quantity of material spilled; and a brief description of any response actions taken or planned.

145 (3) Mitigation and control. The person responsible for a nonpermitted spill or discharge shall take appropriate immediate action to protect human health and the environment (e.g., diking to prevent contamination of state waters, shutting of open valves).

145 (3) (a) In addition, the department may require the person responsible for a spill or discharge to:

145 (3) (i) Clean up all released dangerous wastes or hazardous substances, or to 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.

145 (3) (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

145 (3) (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.

145 (3) (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.

145 (4) Nothing in WAC 173-303-145 shall eliminate any obligations to comply with reporting requirements which may exist in a permit or under other state or federal regulations.

WAC-173-303 Section 355(1)

(1) Owners or operators shall coordinate preparedness and prevention planning and contingency planning efforts, conducted under WAC 173-303-340 and 173-303-350, with local emergency planning committees established pursuant to Title III of the 1986 Superfund Amendments and Reauthorization Act.

20.7 Recordkeeping, Reports and Notifications

WAC-173-401 Section 630(4)

Progress reports. For those sources required to have a schedule of compliance, the permit shall require progress reports consistent with an applicable schedule of compliance and WAC 173-401-510 (2)(h) to be submitted at least semiannually, or at a more frequent period if specified in the applicable requirement or by the permitting authority. Such progress reports shall contain the following:

(a) Dates for achieving the activities, milestones, or compliance required in the schedule of compliance, and dates when such activities, milestones, or compliance were achieved; and

(b) An explanation of why any dates in the schedule of compliance were not or will not be met, and any preventive or corrective measures adopted.

20.0 ENVIRONMENTAL PROTECTION

20.7.1 Incident Investigation and Reporting

40CFR 355 Part 30(b)

Emergency planning notification. The owner or operator of a facility subject to this section shall provide notification to the Commission that it is a facility subject to emergency planning requirements of this Part. Such notification shall be provided: on or before May 17, 1987 or within sixty days after a facility first becomes subject to the requirements of this section, whichever is later.

40CFR 355 Part 40(a)(1)

The requirements of this section apply to any facility:

(i) at which a hazardous chemical is produced, used or stored and

(ii) at which there is release of a reportable quantity of any extremely hazardous substance or CERCLA hazardous substance.

40CFR 355 Part 40(b)(2)

Emergency release notification. Notice requirements. 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.

(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.

WAC-246-247(940131) 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.

WAC-246-247(940131) 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.

20.7.2 Reporting Requirements

40CFR 61 Part 94

Compliance and Reporting

(a) Compliance with this standard shall be determined by calculating the highest effective dose equivalent to any member of the public at any off-site 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 61.93(a) for the previous calendar year.

(b) Items 1 - 8 only

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.

20.0 ENVIRONMENTAL PROTECTION

(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 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.

40CFR 122 Part 41(l)(1)

Reporting requirements.

(1) Planned changes. The permittee shall give notice to the Director as soon as possible of any planned physical alternations or additions to the permitted facility. Notice is required only when:

(i) The alternation or addition to permitted facility may meet one of the criteria of determining whether a facility is a new source in 122.29(b); or

(ii) The alternation or addition results in a significant change in the permittee's sludge use or disposal practices, and such alternation, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application plan;

40CFR 122 Part 41(l)(4)

Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(i) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the Director for reporting results of monitoring of sludge use or disposal practices.

(ii) If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR part 136 or, in the case of sludge use or disposal, approved under 40 CFR 136 unless otherwise specified in 40 CFR part 503, or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Director.

(iii) Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

40CFR 122 Part 41(l)(6)

Twenty-four reporting.

(i) The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(ii) The following shall be included as information which must be reported within 24 hours under this paragraph.

20.0 ENVIRONMENTAL PROTECTION

(A) Any unanticipated bypass which exceeds any effluent limitation in the permit. (See 122.41(g)).

(B) Any upset which exceeds any effluent limitation in the permit.

(C) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in the permit to be reported within 24 hours. (See 122.44(g).)

(iii) The Director may waive the written report on a case-by-case basis for reports under paragraph (l)(6)(ii) of this section if the oral report has been received within 24 hours.

40CFR 122 Part 41(m)(3)

Notice

(i) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(ii) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in paragraph (l)(6) of this section (24-hour notice).

DOE/EH0173T Section 8.3.2

The annual reporting requirements for DOE-controlled facilities include information on liquid releases (DOE 5400.1). The information reported is required to include statements concerning the quantity and type of radioactive materials discharged to receiving streams or aquifers and assessments of the potential radiation dose to the public that could have resulted from these discharges during the previous calendar year. Decisions about which model or models will be used in performing a specific assessment depend on the local site conditions, the receiving stream or aquifer characteristics, the duration of the release, the potential exposure pathways, the magnitude of the potential doses that result, and other factors. The variety of modeling approaches indicates that there is much uncertainty in modeling surface- and ground-water systems, and that many unanswered questions about radionuclide transport through surface- and ground-water systems remain. Additional questions about surface- and ground-water dispersion models have arisen from the need to identify the parameters that can be measured in the field that correspond to the parameters used in the models. Surface- and ground-water modeling in support of the operation of DOE facilities should be conducted by a professional geohydrologist or equivalent with modeling experience. This modeling should be done using site-specific data and taking into consideration the important characteristics of the site.

DOE5400.1 Chapter II, Section 5.a

Radioactive Effluent and On-site Discharge Data Reports covering the previous calendar year shall be submitted to the Waste Information Systems Branch, EG&G Idaho, Inc., Idaho Falls, Idaho 83415, by April 1; a copy of the cover letter shall be sent to EH-1. The reports, including the data forms, cover sheet, maps, and, if necessary, explanatory information shall be submitted in accordance with instructions provided in Section II of the Effluent Information System and On-site Discharge Information System User's Manuals. Maps should be included only when they reflect modifications (terminations or startups, etc.) from previous years. The report shall consist of:

(1) A cover sheet listing the site, facility, report period, contractor(s), and address;

(2) A summary providing pertinent descriptive and interpretative information which would serve to explain any facets of the data which are not adequately described on the sheets. (Classified effluent data should be submitted on separate forms.);

(3) Maps, 8-1/2 x 11 inches, showing the locations of effluent streams and on-site discharge points;

(4) Completed DOE F 5821.1, "Radioactive Effluents/On-site Dischargers/Unplanned Releases," unless submitted via the Secure Automatic Communications Network (SACNET) or directly to the computer operations.

20.0 ENVIRONMENTAL PROTECTION

WAC-173-360 Section 200(1)

Notice of intent to install a new UST system. Except in the circumstances defined in subsection (5) of this section, any owner who intends to install a new UST system shall submit a notice of such intent to the department or delegated agency at least thirty days prior to installing the UST system. Such notice shall meet the following requirements:

(a) The notice of intent shall be provided on the appropriate Washington state form, which is available from the department;

(b) Each UST system to be installed which is regulated under this chapter shall be reported;

(c) Owners may provide notice for more than one UST system using a single form, but UST systems to be installed at separate sites shall be reported on separate forms; and

(d) The completed form shall include all of the information required on the form.

WAC-173-360 Section 200(2)

Notification of new UST systems in use. Within thirty days of bringing any newly installed UST system regulated under this chapter into use, the owner shall submit notice of such UST system to the department. This notice shall meet the following requirements:

(a) The notice shall be provided on the appropriate Washington state underground storage tank notification form, which is available from the department;

(b) Each tank regulated under this chapter shall be reported;

(c) Owners may provide notice for more than one tank using a single notification form, but owners who own tanks located at more than one site shall file a separate notification form for each site;

(d) Notification required under this section shall include all of the information required on the form for each tank for which notice must be given; and

(e) Notification for tanks installed after December 22, 1988, shall also certify compliance with the following requirements:

(i) Corrosion protection of steel tanks and piping under WAC 173-360-305 (1) and (2);
(ii) Financial responsibility under WAC 173-360-400 through 173-360-499; and
(iii) Release detection under WAC 173-360-335 and 173-360-340.

WAC-173-360 Section 200(3)

Installation checklist. All owners and operators of new UST systems shall ensure that a licensed installation supervisor certifies that the methods used to install the tanks and piping comply with the requirements in WAC 173-360-305 (4). Such certification shall be accomplished by completing an installation checklist, which is available from the department, as specified in WAC 173-360-305 (5).

WAC-173-360 Section 200(6)

Changes to UST systems. Any changes in the information initially reported in the notification form submitted under subsection (2), (4) or (5) of this section, including temporary closure of an UST system that was initially reported as being in use, shall be reported to the department or delegated agency by submitting a new notification form within thirty days after such changes occur.

WAC-246-247(940131) 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:

(a) The results of emission measurements for those emission units subject only to periodic confirmatory measurements;
(b) Wind rose or joint frequency table;

20.0 ENVIRONMENTAL PROTECTION

(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.

WAC-246-247(940131) 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 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.

20.7.3 Records Management

40CFR 61 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.

40CFR 61 Part 94

Compliance and Reporting

(a) Compliance with this standard shall be determined by calculating the highest effective dose equivalent to any member of the public at any off-site 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 61.93(a) for the previous calendar year.

(b) Items 1 - 8 only
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 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.

40CFR 61 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

20.0 ENVIRONMENTAL PROTECTION

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.

WAC-173-400 Section 105

(1) the owner or operator of a stationary source listed in a source category of WAC 173-400-100 shall upon notification by the director, maintain records on the type and quantity of emissions from the source and other information deemed necessary by the director to determine whether the source is in compliance with applicable emission limitations and control measures.

WAC-246-247(940131) 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.

WAC-246-247(940131) 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.

WAC-246-247(940131) 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.

20.0 ENVIRONMENTAL PROTECTION

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