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U.S. Department of Energy Depleted Uranium Hexafluoride Conversion Project Requirements Document

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Engineering Technology Division

U.S. DEPARTMENT OF ENERGY DEPLETED URANIUM HEXAFLUORIDE CONVERSION PROJECT REQUIREMENTS DOCUMENT

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ABSTRACT

Public Law 105-204 requires the U.S. Department of Energy to develop a plan for inclusion in the Fiscal Year 2000 budget for conversion of the Department's stockpile of depleted uranium hexafluoride to a more stable form over an extended period. This plan is documented in *Final Plan for the Conversion of Depleted Uranium Hexafluoride as Required by Public Law 105-204*, hereinafter called "the Plan."

This document compiles the requirements necessary to successfully complete the depleted uranium hexafluoride conversion project as outlined within the Plan. The Plan calls for an integrated contractor to propose a method for the conversion, reuse, and/or disposal of the Department's depleted uranium stockpile. The Plan proposes construction of two conversion plants, one each on the Paducah Gaseous Diffusion Plant and the Portsmouth Gaseous Diffusion Plant sites. Residual cylinders of uranium hexafluoride would be transferred from the East Tennessee Technology Park (formerly known as the K-25 Site and the location of the Oak Ridge Gaseous Diffusion Plant, which operated until 1985) to the Portsmouth Gaseous Diffusion Plant site. The project, as outlined in the Plan, would consist of separate phases of cylinder management, conversion, and storage until such time as either a viable reuse for the material is found or a decision to dispose of the material is made.

Because the method of conversion, the form of the converted material, and the method of reuse or eventual disposal is to be proposed by the integrated contractor, this document lists those documents that contain requirements which may apply in order to ensure protection of the environment, the safety and health of workers and the public, and the safeguards and security measures associated with the material. It also outlines the methodology to determine which documents are applicable in given circumstances.

1. INTRODUCTION

From 1945 to 1985, the United States Department of Energy (DOE) and its predecessor agencies built and operated three uranium hexafluoride gaseous diffusion plants: the Oak Ridge Gaseous Diffusion Plant (ORGDP) at Oak Ridge, Tennessee; the Paducah Gaseous Diffusion Plant (PGDP) at Paducah, Kentucky; and the Portsmouth Gaseous Diffusion Plant (PORTS) at Portsmouth, Ohio. In 1985, the DOE ceased operations at ORGDP. Residual cylinders of enriched and natural uranium were transferred to other sites. However, approximately 4,700 cylinders of depleted uranium hexafluoride remain at the ORGDP site, now called the East Tennessee Technology Park (ETTP).

In 1993, the United States Enrichment Corporation (USEC) was formed and took over enrichment operations at the two remaining operating gaseous diffusion plants (PGDP and PORTS). To date, an agreement has been reached whereby the DOE will take ownership of a certain number of depleted UF_6 cylinders created by the USEC operations from 1993 to 1999. The current DOE inventory of depleted uranium hexafluoride cylinders is 57,634 standard 48-in.-diameter (14-T) cylinders, including 11,212 from USEC.

An agreement was reached between DOE and the Tennessee Department of Environment and Conservation (TDEC) that, if DOE chooses to take any action as the outcome of the Programmatic Environmental Impact Statement, that action shall, subject to National Environmental Policy Act (NEPA) review, either result in the removal of all depleted UF_6 cylinders from ETTP or the complete conversion of their contents to a more stable form by December 31, 2009. As part of this project, these cylinders are scheduled to be moved to PORTS.

2. BACKGROUND

Since 1945, the United States has been enriching uranium in the ^{235}U isotope by the process of gaseous diffusion of uranium hexafluoride gas. Since natural uranium is 99.3% ^{238}U and only 0.711% ^{235}U, the production of significant quantities of ^{235}U for weapons and later for civilian power reactor purposes has resulted in a significant stockpile of depleted uranium (^{238}U) hexafluoride stored in cylinders at the gaseous diffusion plant sites.

During the extended period of storage, corrosion has occurred in some of these cylinders, causing a potential hazard for release of the contents. While these problems are being corrected, a more permanent solution is needed.

The conversion of the existing stockpile of depleted ^{238}U to a more stable form, such as uranium metal, uranium dioxide (UO_2), or triuranium octaoxide (U_3O_8) desired. This would remove the potential chemical hazard of the fluorine component of the uranium and make the uranium available for commercial use.

To meet this need, Public Law 105-204 was passed by Congress in 1998 directing the Secretary of Energy to prepare and submit to Congress a plan to ensure that funds accumulated by the USEC for recycle or disposal of depleted uranium will be used to construct and operate one or more plants to

recycle or dispose of the depleted uranium according to NEPA. This plan calls for an integrated contractor to propose construction of a conversion, storage, and disposal plan for the Department's depleted uranium stockpile during the next 25 years.

A Programmatic Environmental Impact Statement[1] was developed which examined several options with regard to depleted uranium storage, reuse, and disposal. This study recommended the immediate commencement of conversion of the depleted uranium hexafluoride to either uranium metal or uranium oxides as a more stable form for long-term storage of the material until future uses could be found or until a decision to dispose of the material is made.

3. OBJECTIVE

The objective of this report is to compile a listing of the requirements documents—the safety fundamentals, safety requirements, safety guides, and safety reports—which apply, depending on the integrated contractor's proposed solutions, to various phases of the depleted uranium hexafluoride conversion project. The safety requirements are listed in the body of the document, and the associated safety fundamentals documents, the safety guidance documents, and the safety reports documents are listed in the Appendices A through C. This report will then provide a basis for the development of a technical standard for storage of converted depleted uranium.

The structure of regulatory oversight has developed in recent years to include a hierarchical structure of documents. The regulatory process begins by stating the desired fundamentals (policies and objectives) to be achieved. This is followed by the development of necessary generic requirements needed to meet these objectives. In order to assist in meeting these requirements, nonmandatory guides are developed which present acceptable methods of meeting the requirements as examples. Finally, reports containing technical information useful in meeting the requirements and guides are developed.

This regulatory document structure has been adopted in this report. The terminology of the International Atomic Energy Agency (IAEA) has been adopted as presented by this excerpt from *Part B, Establishment of International Safety Standards*[2] by the IAEA:

> "In 1989, following a major expansion of the IAEA's safety related activities, the Secretariat introduced a hierarchical structure for IAEA Safety Series publications, which were divided into Safety Fundamentals, Safety Requirements, Safety Guides, and Safety Practices. This structure was further clarified in 1996 by replacing the Safety Series with Safety Standards Series (comprising the Safety Fundamentals, Safety Requirements, and Safety Guides) and the Safety Reports Series (previously Safety Practices). The Safety Fundamentals states the basic objectives, concepts, and principles involved in ensuring protection and safety. The Safety Requirements specify requirements that must be satisfied in order to ensure safety for particular activities or application areas, these requirements being governed by the basic objectives, concepts,

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[1] *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride*, DOE/EIS-0269, April 1999.

[2] *Part B, Establishment of International Safety Standards*, GC(42)/INF/5, Attachment, Part B.

and principles stated in Safety Fundamentals. The Safety Guides supplement Safety Requirements by presenting recommendations, based on international experience, regarding measures to ensure the observance of Safety Requirements.

Safety Reports give examples and description of methods which can be applied in implementing both Safety Requirements and Safety Guides. They are not regulatory documents but rather documents for fostering information exchange. Hence, they are separated from the Secretariats Standards Series."

4. METHOD

For purposes of developing the regulatory structure for the depleted uranium hexafluoride conversion project, the project was divided into regulatory document categories. These categories are Conversion Facility, Packaging and Transportation, Storage Facility, Reuse, Near-Surface Disposal Facility, Geological Disposal Facility, and Conversion Material. This division fit well with the regulatory structure which exists regarding projects of this type.

The regulatory documents outlined in this report were selected for their unique applicability to projects of this nature. Documents such as the National Electrical Code and the National Fire Protection Code were not included because they would be applicable to any project of this type.

Because the methods used to execute this project are to be devised and proposed by the integrated contractor, the exact requirements which apply cannot be stated beforehand with certainty. Therefore, the approach taken in this report is first to state the requirements documents. Requirements documents are those documents which contain requirements which must be followed by any DOE contractor under all circumstances. Secondly, a listing of documents is presented which may become requirements, depending on DOE or contractor choices or selections for draft documents for operations. These include primarily requirements of the Nuclear Regulatory Commission (NRC), draft DOE, and other requirements documents that have not yet been finalized but will become requirements when finalized. Finally, a listing of documents is presented that are negotiable as requirements between DOE and the integrated contractor. These include certain DOE orders and technical standards, certain IAEA standards, and the consensus industry standards.

Projects involving radioactive materials may be subjected in the broadest sense to consideration of the requirements of the IAEA. These requirements are outlined in the Safety Standards Series and the Technical Report Series of the IAEA. The extent of DOE Safeguards compliance with IAEA regulations is outlined in DOE Order 1270.2B, June 23, 1992.

The compliance of the United States with other IAEA Nuclear Safety regulations is outlined by the following excerpt from the *Convention on Nuclear Safety*, Vienna, June 17, 1994:

"The obligations of the parties are based to a large extent on the principles contained in the IAEA Safety Fundamentals document *The Safety of Nuclear Installations*. These obligations cover for instance, siting, design, construction, operation, the availability

> of adequate financial and human resources, the assessment and verification of safety, quality assurance and emergency preparedness.
>
> The Convention is an incentive instrument. It is not designed to ensure fulfillment of obligations by parties through control and sanction but is based on their common interest to achieve higher levels of safety which will be developed and promoted through regular meetings of the parties. The Convention obliges parties to submit reports on the implementation of their obligations for "peer review" at meetings of the parties to be held at the IAEA. This mechanism is the main innovative and dynamic element of the Convention."

The United States ratified this convention on April 17, 1999.

The federal regulation of nuclear projects involves five federal agencies: NRC, DOE, the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and the Department of Transportation (DOT).

The regulations of the EPA govern radiation exposure to the public through exposure to radiation sources and apply to all DOE or contractor operations. The regulations of OSHA govern the safety and health of workers in nuclear installations and also apply to all DOE and contractor operations. DOT governs the safety aspects of the packaging and transportation of all hazardous material in the United States. The NRC has basic jurisdiction over nondefense-related nuclear materials within the United States. Depleted uranium hexafluoride is classified in the NRC regulations as both a byproduct material and a source material. The applicable definitions for each of these materials from the NRC regulations are:

10 CFR 40.4. Definitions

Source Material means: (1) uranium or thorium, or any combination thereof, in any physical or chemical form or (2) ores which contain by weight one-twentieth of one percent (0.05%) or more of: (i) uranium, (ii) thorium or (iii) any combination thereof. Source material does not include special nuclear material.

Thus, the NRC has licensing jurisdiction over the possession, transport, and use of this material. However, an exemption is provided whereby material being used by a DOE prime contractor may be exempt from NRC regulation. The applicable exemption is found in:

10 CFR 40.11. Persons using source material under certain Department of Energy and Nuclear Regulatory Commission contracts.

> Except to the extent that Department facilities or activities of the types subject to licensing pursuant to Section 202 of the Energy Reorganization Act of 1974 or the Uranium Mill Tailings Radiation Control Act of 1978 are involved, any prime contractor of the Department is exempt from the requirements for a license set forth in Sections 62, 63, and 64 of the Act and from the regulations in this part to the extent that such contractor, under his prime contract with the Department, receives, possesses, uses, transfers or delivers source material for:

(1) the performance of work for the Department at a United States Government-owned or controlled site, including the transportation of source material to or from such site and the performance of contract services during temporary interruptions of such transportation;
(2) research in, or development, manufacture, storage, testing or transportation of, atomic weapons or components thereof; or
(3) the use or operation of nuclear reactors or other nuclear devices in a United States Government-owned vehicle or vessel. In addition to the foregoing exemptions, and subject to the requirement for licensing of Department facilities and activities pursuant to Section 202 of the Energy Reorganization Act of 1974 or the Uranium Mill Tailings Radiation Control Act of 1980, any prime contractor or subcontractor of the Department or the Commission is exempt from the requirements for a license set forth in Sections 62, 63, and 64 of the Act and from the regulations in this part to the extent that such prime contractor or subcontractor receives, possesses, uses, transfers or delivers source material under his prime contract or subcontract when the Commission determines that the exemption of the prime contractor or subcontractor is authorized by law; and that, under the terms of the contract or subcontract, there is adequate assurance that the work thereunder can be accomplished without undue risk to the public health and safety.

[40 FR 8787, Mar. 3, 1975, as amended at 43 FR 6923, Feb. 17, 1978; 45 FR 65531, Oct. 3, 1980]

The activities listed under Section 202 of the Energy Reorganization Act of 1974 or the Uranium Mill Tailings Radiation Control Act of 1978 are:

10 CFR 30.4. Definitions.

The Department facilities and activities identified in Section 202 are:

(1) Demonstration Liquid Metal Fast Breeder reactors when operated as part of the power generation facilities of an electric utility system, or when operated in any other manner for the purpose of demonstrating the suitability for commercial application of such a reactor.
(2) Other demonstration nuclear reactors, except those in existence on January 19, 1975, when operated as part of the power generation facilities of an electric utility system, or when operated in any other manner for the purpose of demonstrating the suitability for commercial application of such a reactor.
(3) Facilities used primarily for the receipt and storage of high-level radioactive wastes resulting from licensed activities.
(4) Retrievable Surface Storage Facilities and other facilities authorized for the express purpose of subsequent long-term storage of high-level radioactive waste generated by the Department, which are not used for, or are part of, research and development activities.

From **10 CFR Part 40.3, License requirements:**

A person subject to the regulations in this part may not receive title to, own, receive, possess, use, transfer, provide for long-term care, deliver or dispose of byproduct material or residual radioactive material as defined in this part or any source material after removal from its place of

deposit in nature, unless authorized in a specific or general license issued by the Commission under the regulations in this part.

However, from **10 CFR Part 40.12, Carriers**:

(1) Except as specified in paragraph (b) of this section, common and contract carriers, freight forwarders, warehousemen, and the U.S. Postal Service are exempt from the regulations in this part and the requirements for a license set forth in Section 62 of the Act to the extent that they transport or store source material in the regular course of the carriage for another or storage incident thereto.

(2) The exemption in paragraph (a) of this section does not apply to a person who possesses a transient shipment (as defined in Sec. 40.4(r)), an import shipment, or an export shipment of natural uranium in an amount exceeding 500 kilograms, unless the shipment is in the form of ore or ore residue.

Also, from **10 CFR Part 40.13(a), Unimportant quantities of source material.**

(1) Any person is exempt from the regulations in this part and from the requirements for a license set forth in Section 62 of the Act to the extent that such person receives, possesses, uses, transfers or delivers source material in any chemical mixture, compound, solution, or alloy in which the source material is by weight less than one-twentieth of 1 percent (0.05 percent) of the mixture, compound, solution or alloy.

Therefore, prime contractors of DOE are exempt from NRC licensing under Part 40 when performing work for DOE on a DOE-controlled site. Also, common carriers contracted to transport source material are exempt as stated. Finally, source material, which exists in compounds in very low concentrations (<0.05%), is also exempt from Part 40 regulation and may be transferred to others regardless of the general license.

A series of decision flow charts showing the IAEA and Code of Federal Regulations (CFR) applicability to the various phases of the project are shown in Figs. 1–5.

Figure 2 shows the decision process applicable to packaging and transportation regulation of the radioactive materials in the project. The broadest regulatory structure for packaging and transportation is that of the IAEA, which offers regulations for international packaging and transport and guidance for domestic packaging and transport.

Within the United States, DOT has jurisdiction over all hazardous material packaging and transport through their Hazardous Material Regulations found in 49 CFR 100-180. However, if a shipment in this project is found by DOT to be "not in commerce," the shipment would not be regulated by DOT but by the DOE Headquarters agency. If the shipment is deemed to be "in commerce," then 49 CFR 173.7 offers two provisions of interest.

First, if the material is "for the purpose of national defense" and is transported in DOE-escorted vehicles, the shipment is exempt from DOT transport regulations and is regulated by the DOE–AL Field Office as a defense-related shipment.

Secondly, if the shipment is a nondefense-related shipment for DOE, 49 CFR 173.7 defers the packaging certification function to DOE. However, in 1996 the U.S. Secretary of Energy announced an initiative to transition the radioactive material packaging certification function to NRC regulation.

If the package being shipped contains a greater than Type A quantity of radioactive material, DOT defers the packaging certification function to the NRC. However, 10 CFR 40.12 provides an exemption to the NRC regulations regarding source material, which is the proper classification for depleted uranium, for prime contractors who perform work for DOE on a DOE-owned or controlled site.

Thus, if an integrated contractor is exempt from NRC source material regulation due to 10 CFR 40.12 for possession and transport of depleted uranium during this project, they are not subject to NRC packaging regulations but to those of DOE.

Depleted Uranium Conversion Facility

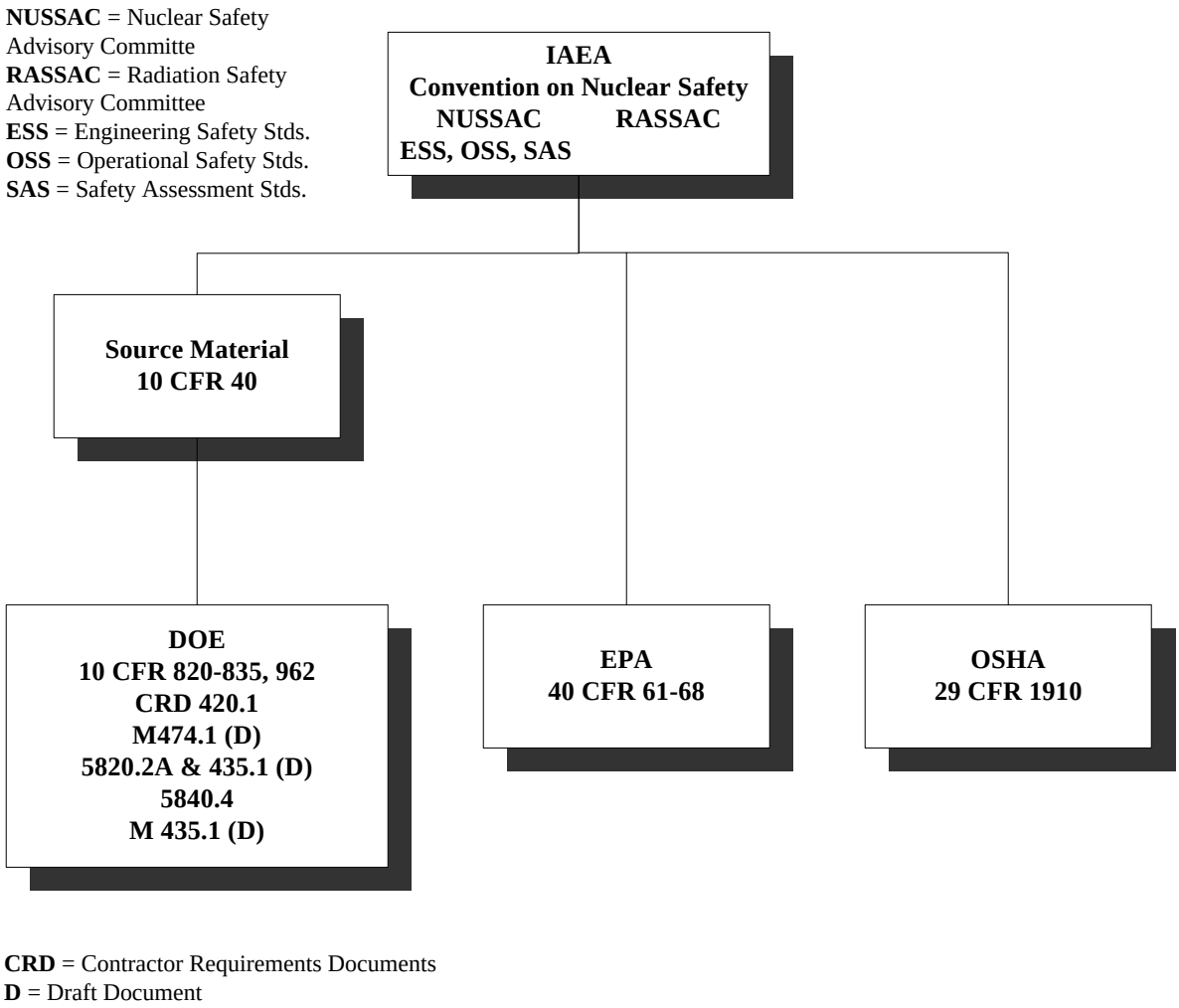

Fig. 1. Regulatory authorities governing depleted uranium conversion facility.

Source Material Packaging and Transportation

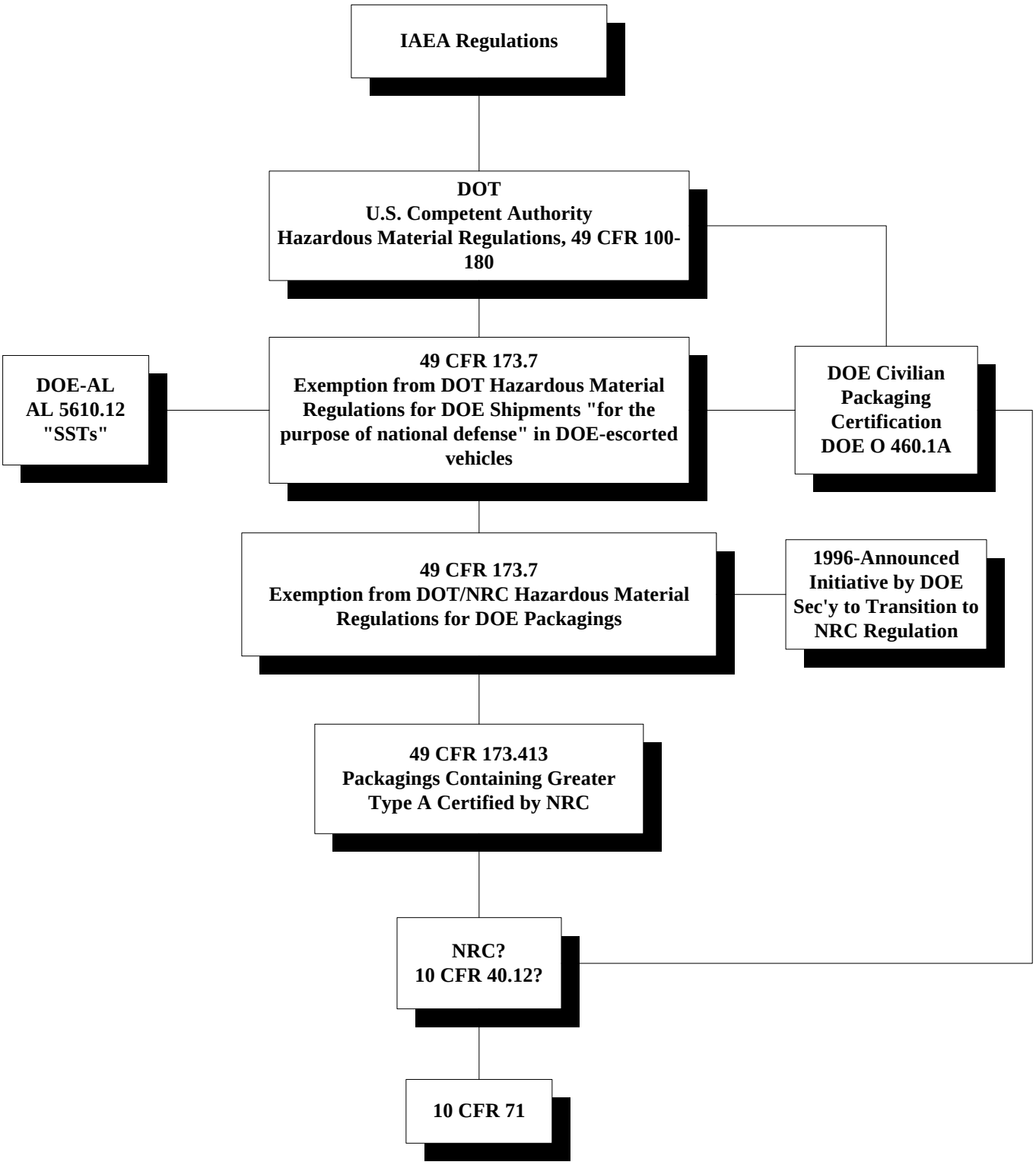

Fig. 2. Regulatory authorities governing depleted uranium packaging and transportation activities.

Source Material Storage Facility

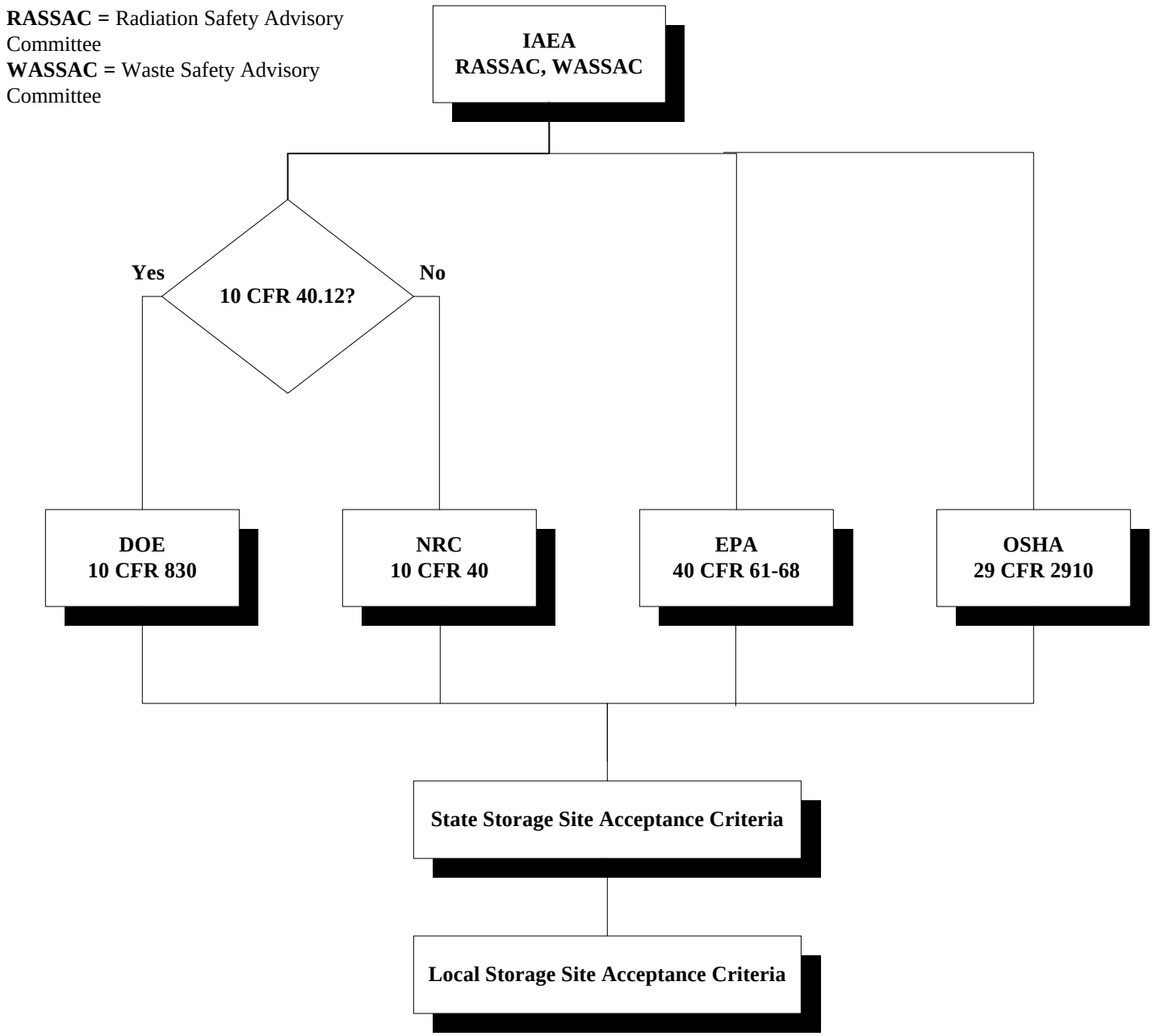

Fig. 3. Regulatory authorities governing depleted uranium storage facility.

Source Material Near-Surface Disposal Facility

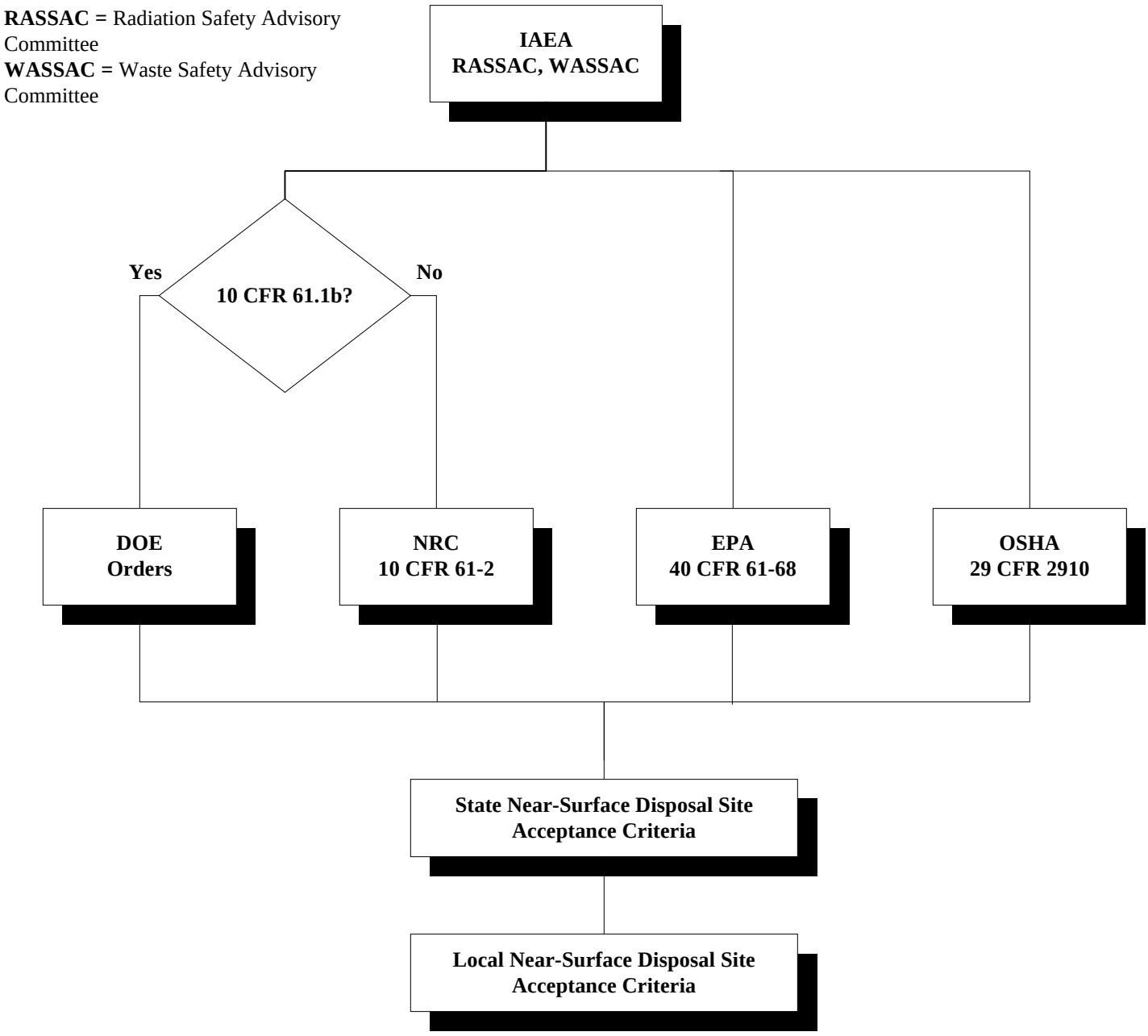

Fig. 4. Regulatory authorities governing depleted uranium near-surface disposal facility.

Source Material Near-Surface Disposal Facility

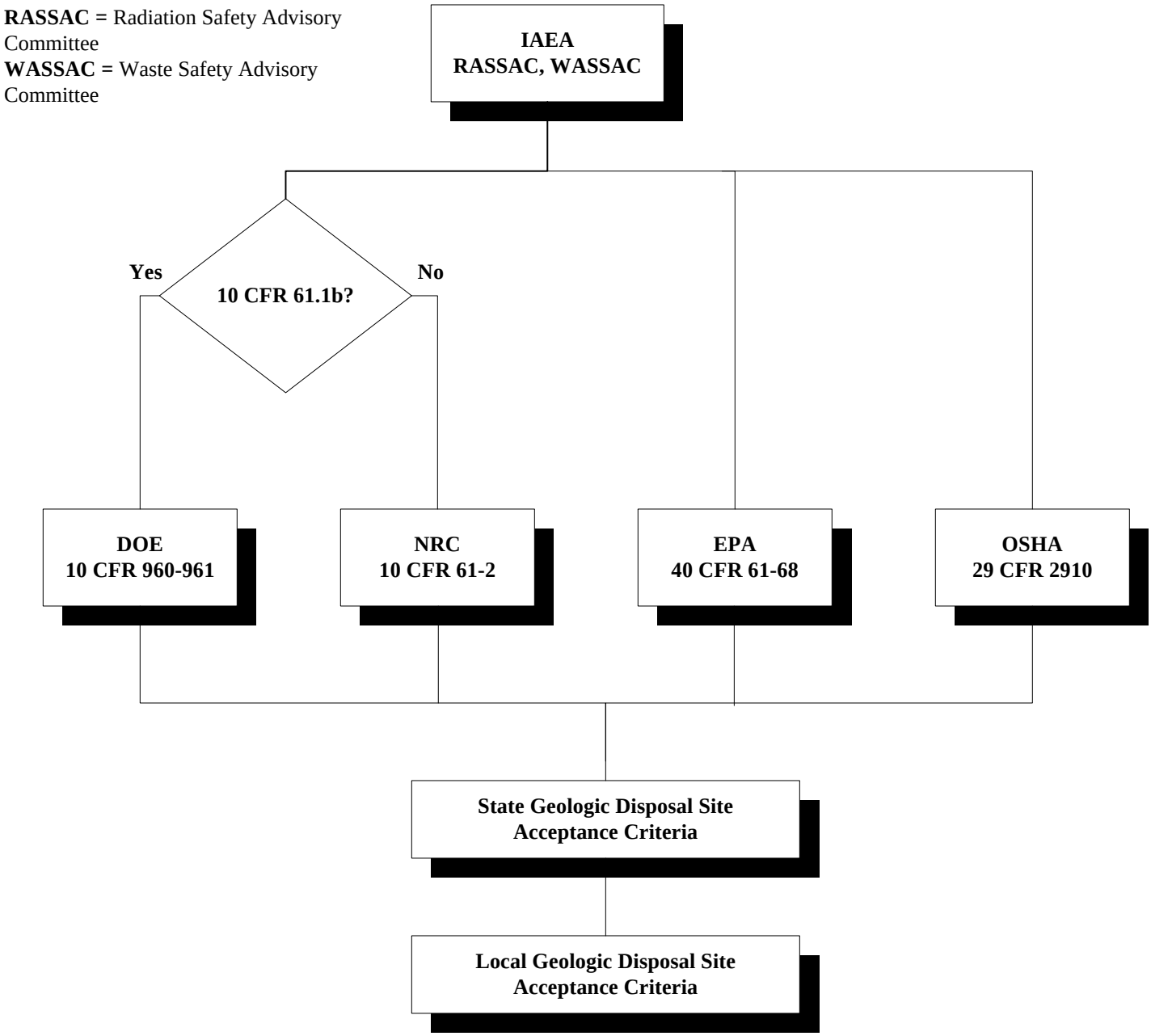

Fig. 5. Regulatory authorities governing depleted uranium geologic disposal facility.

5. REQUIREMENTS DOCUMENTS

Sections 5, 6, and 7 of this document contain document references assembled in three categories. These are

- Section 5: Documents which contain requirements for DOE conversion project integrated contractors;
- Section 6: Documents which may become requirements for DOE conversion project integrated contractors, depending upon DOE and integrated contractor choices with regard to project conduct; and
- Section 7: Documents which are negotiable as requirements between DOE and integrated contractors.

This section, Section 5, contains documents which contain requirements for DOE conversion project integrated contractors.

These documents are listed in seven categories of applicability to the project:

- conversion facility,
- packaging and transportation,
- storage facility,
- reuse of material,
- near-surface disposal facility,
- geologic disposal facility, and
- conversion material.

The sources of the requirements were:

- International Atomic Energy Agency Safety Fundamentals, Safety Requirements, Safety Guides, Safety Reports, and Draft Documents;
- Federal Requirements [Code of Federal Regulations (DOE, DOT, NRC, EPA, OSHA)];
- Department of Energy Policy, Notices, Orders, Directives, Manuals, Guides, Technical Standards, Draft Directives;
- State Environmental, Safety, Health, Transportation Regulations (Ohio, Kentucky, Tennessee, Nevada, Washington); and
- Potential Disposal Site Acceptance Criteria (Nevada Test Site, Hanford Reservation).

1. CONVERSION FACILITY

a. **IAEA**

i. Nuclear Safeguards

(1) Safeguards techniques and equipment, International Nuclear Verifications Series No. 1

b. **FEDERAL**

i. **DOE**

(1) 10 CFR 820, *Procedural Rules for DOE Nuclear Activities*

(2) 10 CFR 830, *Nuclear Safety Management*

(3) 10 CFR 835, *Occupational Radiation Protection*
(4) 10 CFR 840, *Extraordinary Nuclear Occurrences*
(5) 10 CFR 960, *General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories*
(6) 10 CFR 962, *Byproduct Material*
(7) 10 CFR Part 1021, *National Environmental Policy Act Implementing Procedures,* **57 FR 15144**, April 24, 1992
(8) DOE Order 1270.2B, *Safeguards Agreement with the International Atomic Energy Agency*, June 23, 1992
(9) DOE Order 5480.20A, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities*, November 15, 1994
(10) DOE Order 5632.1C, *Protection and Control of Safeguards and Security Interests*, July 15, 1994
(11) DOE Manual 5632.1C-1 Chg. 1, *Manual for Protection and Control of Safeguards and Security Interests*, April 10, 1996
(12) DOE Order 210.1, *Performance Indicators and Analysis of Operations Information,* Chg.2, January 27, 1995
(13) DOE Order 231.1, *Environment, Safety, and Health Reporting,* Chg. 2, November 7, 1996
(14) DOE Order 232.1A, *Occurrence Reporting and Processing of Operations Information,* July 21, 1997
(15) DOE Contractor Requirements 420.1, *CRD Facility Safety*, October 13, 1995
(16) DOE Order 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees*, March 27, 1998
(17) DOE Order 451.1A, *National Environmental Policy Act Compliance Program,* June 5, 1997
(18) DOE Order 470.1 Chg. 1, *Safeguards and Security Program*, September 28, 1995
(19) DOE Contractor Requirements 470.1, *CRD Contractor Safeguards and Security Program Requirements*, September 28, 1995
(20) DOE Manual 474.1-2 Chg. 2, *Nuclear Materials Management and Safeguards System Reporting and Data Submission*, November 16, 1998
(21) DOE Manual 474.1-2 Ch. 1 Chg. 2, *Nuclear Materials Management and Safeguards System Reporting and Data Submission*, November 16, 1998
(22) DOE Manual 474.1-2 Ch. 2–5 Chg. 2, *Nuclear Materials Management and Safeguards System Reporting and Data Submission*, November 16, 1998
(23) DOE Manual 474.1-2 Ch. 8–10, Appendices Chg. 2, *Nuclear Materials Management and Safeguards System Reporting and Data Submission*, November 16, 1998
(24) DOE Order 481.1, *Work for Others (Non-DOE Funded Work)*, September 30, 1996
(25) DOE Manual 481.1-1, *Reimbursable Work for Non-Federal Sponsors Process Manual*, September 30, 1996

ii. **EPA**

(1) 40 CFR Part 61, *National Emission Standards for Hazardous Air Pollutants*
(2) 40 CFR Part 63, *National Emission Standards for Hazardous Air Pollutants for Source Categories*
(3) 40 CFR Part 68, *Chemical and Accident Prevention Provisions*
(4) 40 CFR Part 191, *Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes*

(5) 40 CFR Part 300, *National Oil and Hazardous Substances Pollution Contingency Plan*
(6) 40 CFR Part 302, *Designation, Reportable Quantities, and Notification*
(7) 40 CFR Part 355, *Emergency Planning and Notification*
(8) 40 CFR Part 370, *Hazardous Chemical Reporting: Community Right-to-Know*
(9) 40 CFR Part 372, *Toxic Chemical Release Reporting: Community Right-to-Know*
(10) 40 CFR Part 700, *Toxic Substances Control Act, General*
(11) 40 CFR Part 704, *Reporting and Record Keeping Requirements*
(12) 40 CFR Part 710, *Inventory Reporting Regulations*
(13) 40 CFR Part 712, *Chemical Information Rules*
(14) 40 CFR Part 716, *Health and Safety Data Reporting*
(15) 40 CFR Part 720, *Premanufacture Notification*
(16) 40 CFR Part 721, *Significant New Uses of Chemical Substances*
(17) 40 CFR Part 723, *Premanufacture Notification Exemptions*
(18) 40 CFR Part 792, *Good Laboratory Practice Standards*
(19) 40 CFR Part 795, *Provisional Test Guidelines*
(20) 40 CFR Part 796, *Chemical Fate Testing Guidelines*
(21) 40 CFR Part 795, *Provisional Test Guidelines*
(22) 40 CFR Part 797, *Environmental Effects Testing Guidelines*
(23) 40 CFR Part 798, *Health Effects Testing Guidelines*
(24) 40 CFR Part 1502, *Environmental Impact Statement*

iii. **OSHA**
(1) 29 CFR 1910, *Occupational Safety and Health Standards*

c. **STATE**

i. **Kentucky**
(1) KAR Title 401, *Natural Resources and Environmental Protection Cabinet Department for Environmental Protection*
(2) KAR Title 902, *Cabinet for Human Resources Department for Public Health*, Chapter 47, *Hazardous Substances*

ii. **Ohio**
(1) ORS 1501, *Endangered Species*
(2) ORS 3734, *Ohio Hazardous Waste Facility Board*
(3) ORS 3745, *Environmental Protection Agency—Administration and Director*
(4) ORS 3746, *Voluntary Action Program*
(5) Title 3750, *State Emergency Response Commission*

iii. **Tennessee**
(1) Chapter 0800-1, *Occupational Safety and Health*
(2) Chapter 0800-3, *Boiler Inspection Code*
(3) Chapter 0800-4, *Boiler Inspection Code*
(4) Chapter 1200-1, *Bureau of Environmental Health Services, Division of Food and General Sanitation (F and GS), Division of Solid and Hazardous Waste Management (S and HWM), Division of Ground Water Protection (GWP), Division of Superfund (DSF)*
(5) Chapter 1200-2, *Bureau of Environmental Health Services, Division of Radiological Health*
(6) Chapter 1200-3, *Air Pollution Control*
(7) Chapter 1200-4, *Water Pollution Control*

d. **SITE**
   i. **PGDP**
      (1) *Federal Facility Agreement for the Paducah Gaseous Diffusion Plant*
      (2) *Compliance Agreement Between the United States Department of Energy and the United States Environmental Protection Agency, Washington, D.C.*
      (3) *Paducah USEC Procedures,* Revision 0, Revision Date: May 21, 1999

2. PACKAGING AND TRANSPORTATION SAFETY

a. **FEDERAL**
   i. **DOT**
      (1) 49 CFR Part 171, *General Information, Regulations, and Definitions*
      (2) 49 CFR Part 172, *Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements*
      (3) 49 CFR Part 173, *Shippers—General Requirements for Shipments and Packagings*
      (4) 49 CFR Part 174, *Carriage by Rail*
      (5) 49 CFR Part 175, *Carriage by Aircraft*
      (6) 49 CFR Part 176, *Carriage by Vessel*
      (7) 49 CFR Part 177, *Carriage by Public Highway*
      (8) 49 CFR Part 178, *Specifications for Tank Cars*
      (9) 49 CFR Part 180, *Continuing Qualification and Maintenance of Packagings*
      (10) 49 CFR Part 390, *Federal Motor Carrier Safety Regulations; General*
      (11) 49 CFR Part 397, *Transportation of Hazardous Materials; Driving and Parking Rules*
   ii. **DOE**
      (1) DOE Order 460.1, *Packaging and Transportation Safety*
      (2) DOE Order 460.2, *Departmental Materials Transportation and Packaging Management*

b. **STATE**
   i. **Kentucky**
      (1) None found
   ii. **Ohio**
      (1) ORS 4101, *Boilers*
   iii. **Tennessee**
      (1) Chapter 0800-3-3, *Boiler Inspections*
   iv. **Nevada**
      (1) Chapter 459, *Hazardous Materials*
      (2) Chapter 618, *Occupational Safety and Health Boilers and Pressure Vessels*
      (3) Chapter 705, *Railroads: Transportation of Hazardous Material by Rail*
      (4) Chapter 706, *Motor Carriers: Regulation and Licensing of Motor Carriers*

c. **SITE**
   i. **Nevada Test Site (NTS)**
      (1) DOE-NV-325, NTSWAC (Rev. 1), *Nevada Test Site Waste Acceptance Criteria*, August 1997
   ii. **Hanford Site**
      (1) HNF-EP-0063, Revision 5, *Hanford Site Solid Waste Acceptance Criteria*, June 29, 1998

3. STORAGE FACILITY

a. **FEDERAL**

i. **NRC**

(1) 10 CFR 76, *Certification of Gaseous Diffusion Plants*

ii. **DOE**

(1) 10 CFR 830, *Nuclear Safety Management*
(2) 10 CFR 835, *Occupational Radiation Protection*
(3) 10 CFR 840, *Extraordinary Nuclear Occurrences*
(4) 10 CFR Part 1021, *National Environmental Policy Act Implementing Procedures,* **57 FR 15144**, April 24, 1992
(5) DOE Order 151.1, *Comprehensive Emergency Management*
(6) DOE Order 210.1, *Performance Indicators and Analysis of Operations Information,* Change 002, January 27, 1995
(7) DOE Order 231.1, *Environment, Safety, and Health Reporting,* Change 002, November 7, 1996
(8) DOE Order 232.1A, *Occurrence Reporting and Processing of Operations Information,* July 21, 1997
(9) DOE Order 420.1, *Facility Safety*
(10) DOE Order 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees,* March 27, 1998
(11) DOE Order 451.1A, *National Environmental Policy Act Compliance Program*, June 5, 1997
(12) DOE Order 470.1, *Safeguards and Security Program*
(13) DOE Order 474.1, *Nuclear Materials Management and Safeguards System Reporting and Data Submission*
(14) M 474.1, *Manual Control and Accountability of Nuclear Materials*
(15) DOE Order 1270.2B, *Safeguards Agreement with the International Atomic Energy Agency*
(16) DOE Order 5632.1C, *Protection and Control of Safeguards and Security Interests*
(17) DOE Manual 5632.1C-1 Chg. 1, *Manual for Protection and Control of Safeguards and Security Interests*

iii. **EPA**

(1) 40 CFR Part 61, *National Emission Standards for Hazardous Air Pollutants*
(2) 40 CFR Part 63, *National Emission Standards for Hazardous Air Pollutants for Source Categories*
(3) 40 CFR Part 68, *Chemical and Accident Prevention Provisions*
(4) 40 CFR Part 191, *Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes*
(5) 40 CFR Part 300, *National Oil and Hazardous Substances Pollution Contingency Plan*
(6) 40 CFR Part 302, *Designation, Reportable Quantities, and Notification*
(7) 40 CFR Part 355, *Emergency Planning and Notification*
(8) 40 CFR Part 370, *Hazardous Chemical Reporting: Community Right-to-Know*
(9) 40 CFR Part 372, *Toxic Chemical Release Reporting: Community Right-to-Know*
(10) 40 CFR Part 700, *Toxic Substances Control Act, General*

(11) 40 CFR Part 704, *Reporting and Record Keeping Requirements*
(12) 40 CFR Part 710, *Inventory Reporting Regulations*
(13) 40 CFR Part 712, *Chemical Information Rules*
(14) 40 CFR Part 716, *Health and Safety Data Reporting*
(15) 40 CFR Part 720, *Premanufacture Notification*
(16) 40 CFR Part 721, *Significant New Uses of Chemical Substances*
(17) 40 CFR Part 723, *Premanufacture Notification Exemptions*
(18) 40 CFR Part 792, *Good Laboratory Practice Standards*
(19) 40 CFR Part 795, *Provisional Test Guidelines*
(20) 40 CFR Part 796, *Chemical Fate Testing Guidelines*
(21) 40 CFR Part 795, *Provisional Test Guidelines*
(22) 40 CFR Part 797, *Environmental Effects Testing Guidelines*
(23) 40 CFR Part 798, *Health Effects Testing Guidelines*
(24) 40 CFR Part 1502, *Environmental Impact Statement*

iv. **OSHA**

(1) 29 CFR 1910, *Occupational Safety and Health Standards*

b. **STATE**

i. **Kentucky**

(1) KAR Title 401, *Natural Resources and Environmental Protection Cabinet Department for Environmental Protection*
(2) KAR Title 902, *Cabinet for Human Resources Department for Public Health*, Chapter 47, *Hazardous Substances*

ii. **Ohio**

(1) ORS 1501, *Endangered Species*
(2) ORS 3734, *Ohio Hazardous Waste Facility Board*
(3) ORS 3745, *Environmental Protection Agency—Administration and Director*
(4) ORS 3746, *Voluntary Action Program*
(5) Title 3750, *State Emergency Response Commission*

iii. **Tennessee**

(1) Chapter 0800-1, *Occupational Safety and Health*
(2) Chapter 0800-3, *Boiler Inspection Code*
(3) Chapter 0800-4, *Boiler Inspection Code*
(4) Chapter 1200-1, *Bureau of Environmental Health Services, Division of Food and General Sanitation (F and GS), Division of Solid and Hazardous Waste Management (S and HWM), Division of Ground Water Protection (GWP), Division of Superfund (DSF)*
(5) Chapter 1200-2, *Bureau of Environmental Health Services, Division of Radiological Health*
(6) Chapter 1200-3, *Air Pollution Control*
(7) Chapter 1200-4, *Water Pollution Control*

c. **SITE**

i. **PGDP**

(1) *Paducah USEC Procedures*, Revision 1, Revision Date: July 20, 1999

ii. **PORTS**

(1) BJC-DIR-01, *Bechtel Jacobs Company LLC Directive Manual*, Revision 8, Revision Date: July 27, 1999

4. REUSE

a. **STATE**

i. **Kentucky**

(1) None found

ii. **Ohio**

(1) None found

iii. **Tennessee**

(1) None found

iv. **Nevada**

(1) None found

5. NEAR-SURFACE DISPOSAL FACILITY

a. **STATE**

i. **Kentucky**

(1) Title 410, *Regional Integrated Waste Treatment and Disposal Facility Siting Board*

ii. **Ohio**

(1) Title 3747, *Ohio Low-Level Radioactive Waste Facility Development Authority*

iii. **Tennessee**

(1) Chapter 1200-1-7, *Solid Waste Management Chapter*

(2) Chapter 1200-2-11, *Licensing Requirements for Land Disposal of Radioactive Waste*

(3) Chapter 1200-3, *Air Pollution Control*

(4) Chapter 1200-4, *Water Pollution Control*

iv. **Nevada**

(1) NRS Chapter 328, *Federal Lands*

(2) NRS Chapter 444, *Sanitation*

(3) NRS Chapter 445A, *Water Controls*

(4) NRS Chapter 445B, *Air Controls*

(5) NRS Chapter 445C, *Environmental Requirements*

(6) NRS Chapter 459, *Hazardous Materials*

(7) NRS Chapter 482, *Transportation on Highways (Multistate Agreement)*

(8) NRS Chapter 618, *Occupational Safety and Health*

b. **SITE**

i. **Nevada Test Site (NTS)**

(1) DOE-NV-325, NTSWAC (Rev. 1), *Nevada Test Site Waste Acceptance Criteria*, August 1997

ii. **Hanford Site**

(1) HNF-EP-0063, Revision 5, *Hanford Site Solid Waste Acceptance Criteria*, June 29, 1998

6. GEOLOGIC DISPOSAL FACILITY

a. **STATE**

i. **Kentucky**

(1) None found

ii. **Ohio**

(1) None found

iii. **Tennessee**

(1) None found

iv. **Nevada**

(1) NRS Chapter 328, *Federal Lands*

(2) NRS Chapter 444, *Sanitation*

(3) NRS Chapter 445A, *Water Controls*

(4) NRS Chapter 445B, *Air Controls*

(5) NRS Chapter 445C, *Environmental Requirements*

(6) NRS Chapter 459, *Hazardous Materials*

(7) NRS Chapter 482, *Transportation on Highways (Multistate Agreement)*

(8) NRS Chapter 618, *Occupational Safety and Health*

b. **SITE**

i. **Nevada Test Site (NTS)**

(1) DOE-NV-325, NTSWAC (Rev. 1), *Nevada Test Site Waste Acceptance Criteria*

ii. **Hanford Site**

(1) HNF-EP-0063, Revision 5, *Hanford Site Solid Waste Acceptance Criteria*, June 29, 1998

7. CONVERSION MATERIAL

None found

6. POTENTIAL REQUIREMENTS DOCUMENTS

This section, Section 6, contains documents which may become requirements for DOE conversion project integrated contractors, depending upon DOE and integrated contractor choices with regard to project conduct.

1. CONVERSION FACILITY SAFETY

a. **FEDERAL**

i. **NRC**

(1) 10 CFR 30, *Rules of General Applicability to Domestic Licensing of Byproduct Material*
(2) 10 CFR 31, *General Domestic Licenses for Byproduct Material*
(3) 10 CFR 32, *Specific Domestic Licenses to Manufacture or Transfer Certain Items Containing Byproduct Material*
(4) 10 CFR 33, *Specific Domestic Licenses of Broad Scope for Byproduct Material*
(5) 10 CFR 40, *Domestic Licensing of Source Material*
(6) 10 CFR 60, *Disposal of High-Level Radioactive Wastes in Geologic Repositories*
(7) 10 CFR 61, *Licensing Requirements for Land Disposal of Radioactive Waste*
(8) 10 CFR 62, *Criteria and Procedures for Emergency Access to Non-Federal and Regional Low-Level Waste Disposal Facilities*
(9) 10 CFR 71, *Packaging and Transportation of Radioactive Material*
(10) 10 CFR 75, *Safeguards on Nuclear Material—Implementation of U.S./IAEA Agreement*
(11) 10 CFR 76, *Certification of Gaseous Diffusion Plants*
(12) 10 CFR 150, *Exemptions and Continued Regulatory Authority in Agreement States and in Offshore Waters under Section 274*

ii. **DOE**

(1) DOE M 411.1-1A, *Safety Management Functions, Responsibilities and Authorities Manual* (DRAFT), June 14, 1999
(2) DOE O 414.1A, *Quality Assurance* (DRAFT), June 15, 1999
(3) DOE O 420.x, *Facility Safety* (DRAFT), February 24, 1999
(4) DOE O 440.1A Chg 1, *Worker Protection Management for DOE Federal and Contractor Employees* (DRAFT), July 9, 1999
(5) DOE N 470.1, *Advance Notice of Directive—Revision of DOE O 470.1*, *Safeguards and Security Program* (DRAFT), May 27, 1999
(6) DOE M 470.1-1, *Safeguards and Security Awareness Program Manual* (DRAFT), June 10, 1998
(7) DOE O 471.XX, *Incidents of Security Concern* (DRAFT), April 28, 1999
(8) DOE O 473.1, *Physical Protection of Safeguards and Security Interests* (DRAFT), Jun 18, 1997
(9) DOE M 473.1-1, *Manual for Physical Protection of Safeguards and Security* (DRAFT), June 18, 1997
(10) DOE C 473.1-1, *CRD for Physical Protection of Safeguards and Security* (DRAFT), June 18, 1997
(11) DOE O 473.2, *Protective Force Program* (DRAFT), June 11, 1999
(12) DOE M 473.2-2, *Protective Force Program Manual* (DRAFT), June 11, 1999

(13) DOE O 474.1, *Control and Accountability of Nuclear Materials* (DRAFT), January 1, 1998
(14) DOE M 474.1, *Manual Control and Accountability of Nuclear Materials* (DRAFT), October 30, 1998
(15) DOE O 481.1x, *Work for Others (Non-Department of Energy Funded Work)* (DRAFT), December 15, 1998

2. PACKAGING AND TRANSPORTATION SAFETY
a. **FEDERAL**
i. **NRC**
(1) 10 CFR 71, *Packaging and Transportation of Radioactive Material*

3. STORAGE FACILITY

4. REUSE
a. **FEDERAL**
i. **NRC**
(1) 10 CFR 30, *Rules of General Applicability to Domestic Licensing of Byproduct Material*
(2) 10 CFR 40, *Domestic Licensing of Source Material*

5. NEAR-SURFACE DISPOSAL FACILITY
a. **FEDERAL**
i. **NRC**
(1) 10 CFR 61, *Licensing Requirements for Land Disposal of Radioactive Waste*
(2) 10 CFR 62, *Criteria and Procedures for Emergency Access to Non-Federal and Regional Low-Level Waste Disposal Facilities*

6. GEOLOGIC DISPOSAL FACILITY
a. **FEDERAL**
i. **NRC**
(1) 10 CFR 60, *Disposal of High-Level Radioactive Wastes in Geologic Repositories*

7. CONVERSION MATERIAL
None found

7. NEGOTIABLE REQUIREMENTS DOCUMENTS

This section, Section 7, contains documents which are negotiable as requirements between DOE and integrated contractors.

1. CONVERSION FACILITY SAFETY

a. **IAEA**

i. **Emergency Preparedness and Response**

(1) *Interim Requirements for Nuclear and Radiation Emergency Preparedness and Response* (DRAFT), NS43

(2) *Emergency Preparedness Exercises for Nuclear Facilities: Preparation, Conduct and Evaluation*, Safety Series No. 73

(3) *Safety Culture—A Report by the International Nuclear Safety Advisory Group*, Safety Series No. 75-INSAG-4

(4) *On-Site Habitability in the Event of an Accident at a Nuclear Facility*, Safety Series No. 98

(5) *The Regulatory Process for the Decommissioning of Nuclear Facilities*, Safety Series No. 103

(6) *Intervention Criteria in a Nuclear or Radiation Emergency*, Safety Series No. 109

ii. **Quality Assurance**

(1) *Quality Assurance for Safety in Nuclear Power Plants and Other Nuclear Installations (1996)*, 50-C-Q

iii. **Radiation Safety**

(1) *Occupational Radiation Protection: Assessment of Exposure from External Sources of Radiation* (DRAFT), NS12

(2) *Occupational Radiation Protection in the Decommissioning of Nuclear Facilities* (DRAFT), NS21

(3) *Application of the Principles for Exclusion, Exemption and Clearance from Regulatory Control* (DRAFT), NS33

(4) *Preventing, Detecting of and Responding to Illicit Trafficking in Radioactive Materials* (DRAFT), NS61

(5) *Occupational Radiation Protection: Application of Principles* (DRAFT), NS69

(6) *Training in Radiation and Waste Safety* (DRAFT), NS73

(7) *Emergency Preparedness Exercises for Nuclear Facilities: Preparation, Conduct and Evaluation*, Safety Series No. 73

(8) *Derived Intervention Levels for Application in Controlling Radiation Doses to the Public in the Event of a Nuclear Accident or Radiological Emergency—Principles, Procedures and Data*, Safety Series No. 81

(9) *Occupational Radiation Protection: Assessment of Exposure from Intakes of Radionuclides* (DRAFT), NS85

(10) *Medical Handling of Accidentally Exposed Individuals*, Safety Series No. 88

(11) *Principles for the Exemption of Radiation Sources and Practices from Regulatory Control*, Safety Series No. 89

(12) *Emergency Planning and Preparedness for Accidents Involving Radioactive Materials Used in Medicine, Industry, Research and Teaching*, Safety Series No. 91

(13) *Operational Radiation Protection: A Guide to Optimization*, Safety Series No. 101

(14) *Extension of the Principles of Radiation Protection to Sources of Potential Exposure*, Safety Series No. 104
(15) *Health Surveillance of Persons Occupationally Exposed to Ionizing Radiation: Guidance for Occupational Physicians*, Safety Reports Series No. 5
(16) *Quality Assurance in Radiation Protection* (DRAFT*)*, NS113
(17) *International Basic Safety Standards for Protection Against Ionizing Radiation and for the Safety of Radiation Sources: A Safety Standard*, Safety Series No. 115

iv. **Discharges**

(1) *Regulatory Control of Radioactive Discharges into the Environment* (DRAFT*)*, NS25
(2) *Source and Environmental Monitoring for Radiation Protection of the Public (DRAFT),* NS62
(3) *Principles for Limiting Releases of Radioactive Effluents into the Environment*, Safety Series No. 77, 1986
(4) *Discharges of Radionuclides into the Environment (DRAFT),* NS285

b. **FEDERAL**

i. **DOE**

(1) DOE Order 1300.2A, *Department of Energy Technical Standards Program*, May 19, 1992
(2) DOE Order 5400.1 Chg. 1, *General Environmental Protection Program*, June 29, 1990
(3) DOE Order 5400.5 Chg. 2, *Radiation Protection of the Public and the Environment*, January 7, 1993
(4) DOE Order 5480.4 Chg. 4, *Environmental Protection, Safety, and Health Protection Standards*, January 7, 1993
(5) DOE Order 5480.19 Chg. 1, *Conduct of Operations Requirements for DOE Facilities*, May 18, 1992
(6) DOE Order 5480.21, *Unreviewed Safety Questions*, December 24, 1991
(7) DOE Order 5480.22 Chg. 2, *Technical Safety Requirements*, January 23, 1996
(8) DOE Order 5480.23 Chg. 1, *Nuclear Safety Analysis Reports*, March 19, 1994
(9) DOE Order 5484.1 Chg. 7, *Environmental Protection, Safety and Health Protection Information Reporting Requirements*, October 17, 1990
(10) DOE Order 5632.7A Chg. 1, *Protective Force Program*, February 13, 19195
(11) DOE Order 5633.3B, *Control and Accountability of Nuclear Materials*
(12) DOE Order 5660.1B, *Management of Nuclear Materials*, May 26, 1994
(13) DOE/ID-10500, *Hoisting and Rigging Manual*, U.S. Department of Energy, Washington, D.C., April 1993
(14) DOE Manual 411.1-1, *Safety Management Functions, Responsibilities, and Authorities*
(15) DOE Order 414.1, *Quality Assurance*, November 24, 1998
(16) DOE Order 425.1A, *Facility Safety , Startup and Restart of Nuclear Facilities*
(17) DOE Order 435.1, *Radioactive Waste Management*, July 9, 1999
(18) DOE Manual 435.1-1, *Radioactive Waste Management Manual*, July 9, 1999
(19) DOE Order 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees*
(20) DOE N 441.1, *Radiological Protection for DOE Activities*, September 29, 1995
(21) DOE Order 440.1A Chg. 1, *Worker Protection Management for DOE Federal and Contractor Employees* (DRAFT), July 9, 1999

(22) DOE N 441.4, Extension of DOE N 441.1, *Radiological Protection for DOE Activities*, November 20, 1998
(23) DOE Manual 450.3-1, *DOE Closure Process for Necessary and Sufficient Sets of Standards*, January 25, 1996
(24) DOE Order 451.1A, *National Environmental Policy Act Compliance Program*, June 5, 1997
(25) DOE Order 470.2, *Safeguards and Security Independent Oversight Program*, December 23, 1998
(26) DOE Order 471.XX, *Incidents of Security Concern* (DRAFT), April 2, 1999
(27) DOE Order 473.1, *Physical Protection of Safeguards and Security Interests* (DRAFT), June 18, 1997
(28) DOE Manual 473.1-1, *Manual for Physical Protection of Safeguards and Security* (DRAFT), June 18, 1997
(29) DOE C 473.1-1, *CRD for Physical Protection of Safeguards and Security* (DRAFT), June 18, 1997
(30) DOE Order 473.2, *Protective Force Program* (DRAFT), June 11, 1999
(31) DOE Manual 473.2-2, *Protective Force Program Manual* (DRAFT), June 11, 1999

ii. **EPA**

(1) EPA Publication SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*
(2) *Low-Level Licensing Branch, Technical Position on Radioactive Waste Classification,* Rev. 0, May 1983
(3) USEPA, *Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Wastes*, PB94-463603, OSWER 9938.4-03, April 1994.

c. **STATE**

i. **Kentucky**

(1) *Building Officials and Code Administrators International, Inc.,* Kentucky Building Code, 1997

ii. **Ohio**

(1) *Building Officials and Code Administrators International, Inc.,* Kentucky Building Code with Ohio Elevator Code, 1999

d. **SITE**

i. **PGDP**

(1) BJC-DIR-01, *Bechtel Jacobs Company LLC Directive Manual,* Revision 7, Revision Date: June 23, 1999

ii. **PORTS**

(1) BJC-PO-01, *Portsmouth M&I Site Procedures Manual*, Revision 40, Revision Date: June 28, 1999
(2) BJC-DIR-01, *Bechtel Jacobs Company LLC Directive Manual*, Revision 7, Revision Date: June 23, 1999

iii. **ETTP**

(1) BJC-DIR-01, *Bechtel Jacobs Company LLC Directive Manual*, Revision 7, Revision Date: June 23, 1999

e. **CONSENSUS**

i. **American Concrete Institute (ACI)**

(1) ACI 349-1997, *Code Requirements for Nuclear Safety Related Concrete Structures* (ACI 349-97)

(2) ACI 349.3R-1996, *Evaluation of Existing Nuclear Safety-Related Concrete Structures*
(3) ACI SP-158-1995, *Concrete and Grout in Nuclear and Hazardous Waste Disposal*

ii. **American Institute of Chemical Engineers (AICHE)**
(1) AICHE G2, *Guidelines for Use of Vapor Cloud Dispersion Models*
(2) AICHE G3, *Guidelines for Safe Storage and Handling of High Toxic Hazard Materials*
(3) AICHE G4, *Guidelines for Vapor Release Mitigation*
(4) AICHE VAPOR, *Workbook of Test Cases for Vapor Cloud Source Dispersion Models*
(5) AICHE T80, *Dow's Fire & Explosion Index Hazard Classification Guide*

iii. **American Institute for Steel Construction (AISC)**
(1) *AISC N690, Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities* (see AISC S327)
(2) AISC S327-1984, *Nuclear Facilities—Steel Safety-Related Structures for Design Fabrication and Erection*

iv. **American National Standards Institute (ANSI)**
(1) ANSI N2.1, *Warning Symbols—Radiation Symbol*, 1989
(2) ANSI N12.1, *Warning Symbols—Fissile Material Symbol*, 1989
(3) ANSI N13.3, *Dosimetry for Criticality Accidents*, 1969
(4) ANSI N13.5, *Direct Reading and Indirect Reading Pocket Dosimeters for X- and Gamma Radiation, Performance Specs. for 1972*
(5) ANSI N13.6, *Occupational Radiation Exposure Records Systems, Practice for 1966*
(6) ANSI N13.7, *Radiation Protection—Photographic Film Dosimeters—Criteria for Performance*, 1983
(7) ANSI N13.15, *Radiation Detectors—Personnel Thermoluminescence Dosimetry Systems—Performance*, 1985
(8) ANSI N13.27, *Pocket-Sized Alarm Dosimeters and Alarm Ratemeters, Performance Requirements for 1981*
(9) ANSI N14.6, *Radioactive Materials—Special Lifting Devices for Shipping Containers Weighing 10 000 Pounds (4500 kg) or More*, 1993
(10) ANSI N15.15, *Assessment of the Assumption of Normality (Employing Individual Observed Values)*, 1974
(11) ANSI N15.18, *Nuclear Materials—Mass Calibration Techniques for Control*, 1988
(12) ANSI N15.19, *Nuclear Materials Control—Volume Calibration Techniques*, 1989
(13) ANSI N15.20, *Guide to Calibrating Nondestructive Assay Systems*, 1975
(14) ANSI N15.22, *Nuclear Materials—Plutonium-Bearing Solids—Calibration Techniques for Calorimetric Assay*, 1987
(15) ANSI N15.36, *Nuclear Materials—Nondestructive Assay Measurement Control and Assurance*, 1994
(16) ANSI N15.51, *Nuclear Materials Management—Measurement Control Program—Nuclear Materials Analytical Chemistry Laboratory*, 1990
(17) ANSI N15.54, *Instrumentation—Radiometric Calorimeters Measurement Control Program*, 1988
(18) ANSI N544, *Signal Connectors for Nuclear Instruments*,1968
(19) ANSI N545, *Thermoluminescence Dosimetry: Environmental Applications, Performance, Testing, and Spec. for 1975*

v. **American Nuclear Society (ANS)**

(1) ANS 5.10, *Airborne Release Fractions at Non-Reactor Nuclear Facilities*
(2) ANS 8.1, *Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors*
(3) ANS 8.7, *Guide for Nuclear Criticality Safety in the Storage of Fissile Materials*
(4) ANS 8.10, *Criteria for Nuclear Criticality Safety Controls in Operations with Shielding and Confinement*
(5) ANS 8.15, *Nuclear Criticality Control of Special Actinide Elements*
(6) ANS 8.19, *Administrative Practices for Nuclear Criticality Safety*
(7) ANS 8.20, *Nuclear Criticality Safety Training*
(8) ANS 8.23, *Nuclear Criticality Accident Emergency Planning and Response*
(9) ANS 10.4, *Guidelines for the Verification and Validation of Scientific and Engineering Computer Programs for the Nuclear Industry*
(10) ANS 58.3, *Physical Protection for Nuclear Safety-Related Systems and Components*
(11) ANS 59.3, *Nuclear Safety Criteria for Control Air Systems*

vi. **American Society of Civil Engineers (ASCE)**
(1) ASCE 1, N-725 *Guideline for Design and Analysis of Nuclear Safety Related Earth Structures*
(2) ASCE 4, *Seismic Analysis of Safety-Related Nuclear Structures and Commentary on Standard for Seismic Analysis of Safety Related Nuclear Structures*
(3) ASCE 58, *Structural Analysis and Design of Nuclear Plant Facilities*
(4) ASCE Summary, *Summary Description of Design Criteria, Codes, Standards, and Regulatory Provisions Typically Used for the Civil and Structural Design of Nuclear Fuel Cycle Facilities*

vii. **American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)**
(1) ASHRAE DG-1, *Heating, Ventilating, and Air-Conditioning Design Guide for Department of Energy Nuclear Facilities*
(2) ASHRAE Ch. 23, *Nuclear Facilities* (ASHRAE Handbook, HVAC Applications, IP Edition)
(3) ASHRAE, Ch. 23, *Nuclear Facilities* (ASHRAE Handbook, Applications, SI Edition)
(4) ASHRAE 3970, *Refrigerant Management Challenges at a Nuclear Facility*

viii. **American Society of Mechanical Engineers (ASME)**
(1) ASME AG-1-1997, *Code on Nuclear Air and Gas Treatment*
(2) ASME N510-1989, *Testing of Nuclear Air Treatment Systems Errata—1991*
(3) ASME N626.0-1982, *Qualifications and Duties for Authorized Inspection Agencies, Nuclear Inspectors, and Nuclear Inspector Supervisors*
(4) ASME N626.1-1982, *Qualifications and Duties for Authorized Inspection Agencies, Nuclear Inservice Inspectors, and Nuclear Inservice Inspector Supervisors*
(5) NQA-1-1997, *Quality Assurance Requirements for Nuclear Facility Applications*
(6) *ASME Boiler and Pressure Vessel Code*, 1999

ix. **American Society for Nondestructive Testing (ASNT)**
(1) ASNT 125 VOL 1 SEC 13, *Applications of Leak Testing in the Nuclear Power Industry (Nondestructive Testing Handbook, Vol. 1: Leak Testing)*
(2) ASNT 126 VOL 2 SEC 13, *Applications of Penetrant Testing in the Nuclear Power Industry (Nondestructive Testing Handbook, Vol. 2: Liquid Penetrant Testing)*
(3) ASNT 130 VOL 5 SEC 8, *Acoustic Emission Applications in the Nuclear and Utilities Industries*

(4) ASNT 2410, *Minimum Requirements for Qualification and Certification of Nondestructive Examination Personnel for the Nuclear Power Industry*

x. **American Society for Testing and Materials (ASTM)**

(1) ASTM C696, *Standard Test Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Uranium Dioxide Powders and Pellets E1—1994*

(2) ASTM C697, *Standard Test Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Plutonium Dioxide Powders and Pellets*

(3) ASTM C753, *Standard Specification for Nuclear-Grade, Sinterable Uranium Dioxide Powder*

(4) ASTM C761, *Standard Test Methods for Chemical, Mass Spectrometric, Spectrochemical, Nuclear, and Radiochemical Analysis of Uranium Hexafluoride*

(5) ASTM C788, *Standard Specification for Nuclear-Grade Uranyl Nitrate Solution*

(6) ASTM C799, *Standard Test Methods for Chemical, Mass Spectrometric, Spectrochemical, Nuclear, and Radiochemical Analysis of Nuclear-Grade Uranyl Nitrate Solutions*

(7) ASTM C859 Rev. B, *Standard Terminology Relating to Nuclear Materials*

(8) ASTM C986, *Standard Guide for Developing Training Programs in the Nuclear Fuel Cycle E1—1995*

(9) ASTM C1109, *Standard Test Method for Analysis of Aqueous Leachates from Nuclear Waste Materials Using Inductively*

(10) ASTM C1133, *Standard Test Method for Nondestructive Assay of Special Nuclear Material in Low-Density Scrap and Waste by Segmented Passive Gamma-Ray Scanning*

(11) ASTM C1144, *Standard Test Method for Splitting Tensile Strength for Brittle Nuclear Waste Forms*

(12) ASTM C1221, *Standard Test Method for Nondestructive Analysis of Special Nuclear Materials in Homogeneous Solutions by Gamma-Ray Spectrometry*

(13) ASTM C1316, *Standard Test Method for Nondestructive Assay of Nuclear Material in Scrap and Waste by Passive-Active Neutron Counting Using a 252Cf Shuffler*

(14) ASTM C1334, *Standard Specification for Uranium Oxides with a 235U Content of Less Than 5% for Dissolution Prior to Conversion to Nuclear-Grade Uranium Dioxide*

(15) ASTM C1348, *Standard Specification for Blended Uranium Oxides with a 235U Content of Less Than 5 % for Direct Hydrogen Reduction to Nuclear Grade Uranium Dioxide*

(16) ASTM D3843, *Standard Practice for Quality Assurance for Protective Coatings Applied to Nuclear Facilities*

(17) ASTM D4227, *Standard Practice for Qualification of Journeyman Painters for Application of Coatings to Concrete Surfaces of Safety Related Areas in Nuclear Power Facilities*

(18) ASTM D4286, *Standard Practice for Determining Coating Contractor Qualifications for Nuclear Powered Electric Generation Facilities E1—1996*

(19) ASTM D4537, *Standard Guide for Establishing Procedures to Qualify and Certify Inspection Personnel for Coating Work in Nuclear Facilities*

(20) ASTM D5139, *Standard Specification for Sample Preparation for Qualification Testing of Coatings to be Used in Nuclear Power Plants*

(21) ASTM E235, *Standard Specification for Thermocouples, Sheathed, Type K, for*

Nuclear or for Other High-Reliability Applications E1—1996

(22) ASTM E669, *Standard Master Matrix for Nuclear Fuel Cycle Standards*

(23) ASTM E1034, *Standard Specification for Nuclear Facility Transient Worker Records*

xi. **Canadian Standards Association (CSA)**

(1) CAN/CSA-N288.4-M90, *Guidelines for Radiological Monitoring of the Environment*

xii. **Compressed Gas Association (CGA)**

(1) CGA C-1, *Methods for Hydrostatic Testing of Compressed Gas Cylinders,* Seventh Edition

(2) CGA C-6, *Standards for Visual Inspection of Steel Compressed Gas Cylinders,* Seventh Edition

(3) CGA C-6.1, *Standards for Visual Inspection of High Pressure Aluminum Compressed Gas Cylinders,* Third Edition

(4) CGA C-6.3, *Guidelines for Visual Inspection and Requalification of Low Pressure Aluminum Compressed Gas Cylinders,* First Edition

(5) CGA C-10, *Recommended Procedures for Changes of Gas Service for Compressed Gas Cylinders,* Third Edition

(6) CGA C-11, *Recommended Practices for Inspection of Compressed Gas Cylinders at Time of Manufacture,* Second Edition

(7) CGA P-15, *Filling of Industrial and Medical Nonflammable Compressed Gas Cylinders,* Second Edition

(8) CGA S-7, *Method for Selecting Pressure Relief Devices for Compressed Gas Mixtures in Cylinders,* Second Edition

(9) CGA SB-3, *Evidence of Ownership of Compressed Gas Cylinders,* First Edition

(10) CGA SB-13, *Use of Regulators on Compressed Gas Cylinders Over 3000 psig*

(11) CGA TB-8, *Evidence of Ownership of Compressed Gas Cylinders,* First Edition

xiii. **Copper Development Association (CDA)**

(1) CDA 702/4, *Copper Containers for Nuclear Waste Disposal*

xiv. **Institute of Electrical and Electronics Engineers (IEEE)**

(1) IEEE 336, *Standard Installation, Inspection, and Testing Requirements for Power, Instrumentation, and Control Equipment at Nuclear Facilities*

(2) IEEE 1214, *Standard Multichannel Analyzer (MCA) Histogram Data Interchange Format for Nuclear Spectroscopy*

(3) IEEE N42.4, *Standard for High Voltage Connectors for Nuclear Instruments (ANSI/IEEE)*

xv. **Instrument Society of America (ISA)**

(1) ISA RP67.04 PART 1, *Methodologies for the Determination of Set Points for Nuclear Safety-Related Instrumentation*

(2) ISA RP67.04 PART 2, *Methodologies for the Determination of Set Points for Nuclear Safety-Related Instrumentation*

(3) ISA S67.01, *Transducer and Transmitter Installation for Nuclear Safety Applications*

(4) ISA S67.14, *Qualifications and Certification of Instrumentation and Control Technician in Nuclear Facilities*

xvi. **International Standards Association (ISO)**

(1) ISO 1709, *Nuclear Energy—Fissile Materials—Principles of Criticality Safety in*

Storing, Handling and Processing, Second Edition

(2) ISO 4705, *Refillable Seamless Steel Gas Cylinders,* First Edition; Technical Corrigendum 1—1998

(3) ISO 4706, *Refillable Welded Steel Gas Cylinders,* First Edition; (PNS 03: 1992)

(4) ISO 4978, *Flat Rolled Steel Products for Welded Gas Cylinders,* First Edition; (PNS 869: 1992)

(5) ISO 6406, *Periodic Inspection and Testing of Seamless Steel Gas Cylinders*, First Edition

(6) ISO 7225, *Gas Cylinders—Precautionary Labels*, First Edition; (Corrected and Reprinted —1995)

(7) ISO TR 7470, *Valve Outlets for Gas Cylinders—List of Provisions Which are Either Standardized or in Use*, Second Edition

(8) ISO 7476, *Determination of Uranium in Uranyl Nitrate Solutions of Nuclear Grade Quality—Gravimetric Method*, First Edition

(9) ISO 7753, *Nuclear Energy—Performance and Testing Requirements for Criticality Detection and Alarm Systems*, First Edition

(10) ISO 9892, *Uranium Metal, Uranium Dioxide Powder and Pellets, and Uranyl Nitrate Solutions—Determination of Fluorine Content—Fluoride Ion Selective Electrode Method*, First Edition

(11) ISO 10286, *Gas Cylinders—Terminology*, Second Edition

(12) ISO 10297, *Gas Cylinders—Refillable Gas Cylinder Valves—Specification and Type Testing,* First Edition

(13) ISO 10460, *Welded Carbon Steel Gas Cylinders—Periodic Inspection and Testing*, First Edition

(14) ISO 10461, *Seamless Aluminum-Alloy Gas Cylinders—Periodic Inspection and Testing*, First Edition

(15) ISO 10920, *Gas Cylinders—25E Taper Thread for Connection of Valves to Gas Cylinders—Specification*, First Edition

(16) ISO 11114-1, *Transportable Gas Cylinders—Compatibility of Cylinder and Valve Materials with Gas Contents—Part 1: Metallic Materials*, First Edition

(17) ISO 11114-3, *Transportable Gas Cylinders—Compatibility of Cylinder and Valve Materials with Gas Contents—Part 3: Autogenous Ignition Test in Oxygen Atmosphere*, First Edition

(18) ISO 11116-1, *Gas Cylinders—17E Taper Thread for Connection of Valves to Gas Cylinders—Part 1: Specification*, First Edition

(19) ISO 11116-2, *Gas Cylinders—17E Taper Thread for Connection of Valves to Gas Cylinders—Part 2: Inspection Gauges*, First Edition

(20) ISO 11117, *Gas Cylinders—Valve Protection Caps and Valve Guards for Industrial and Medical Gas Cylinders—Design, Construction and Tests*, First Edition

(21) ISO 11120, *Gas Cylinders—Refillable Seamless Steel Tubes of Water Capacity between 150 I and 3 000 I—Design, Construction and Testing*, First Edition

(22) ISO 11191, *Gas Cylinders—25E Taper Thread for Connection of Valves to Gas Cylinders—Inspection Gauges*, First Edition

(23) ISO 11621, *Gas Cylinders—Procedures for Change of Gas Service*, First Edition

(24) ISO 11625, *Gas Cylinders—Safe Handling*, First Edition

(25) ISO 13341, *Transportable Gas Cylinders—Fitting of Valves to Gas Cylinders*, First Edition; Technical Corrigendum 1: 1998

(26) ISO TR 13763, *Safety and Performance Criteria for Seamless Gas Cylinders*, First

Edition (Corrigendum 1—1996)

(27) ISO 13770, *Aluminum Alloy Gas Cylinders—Operational Requirements for Avoidance of Neck and Shoulder Cracks*, First Edition

xvii. **Japanese Industrial Standards (JIS)**

(1) JIS B 7958, *Continuous Analyzers for Fluorine Compounds in Ambient Air*

(2) JIS K 0105, *Methods for Determination of Fluorine Compounds in Exhaust Gas*

xviii. **Manufacturers Standardization Society (MSS)**

(1) MSS SP-87, *Factory-Made Butt-Welding Fittings for Class I Nuclear Piping Applications*

(2) MSS SP-100, *Qualification Requirements for Elastomer Diaphragms for Nuclear Service Diaphragm Type Valves*

xix. **National Board of Boiler and Pressure Vessel Inspectors (NBBP)**

(1) NBBP NB-23, *National Board Inspection Code,*1998

(2) NBBP NB-102, *National Board Authorization to Repair, Modify or Replace Nuclear Components*

(3) NBBP NB-166, *Form NVR-1, Report of Repair, Modification or Replacement of Nuclear Pressure Relief Device*

xx. **National Commission on Radiation Protection (NCRP)**

(1) NCRP 4, *Guidelines for the Release of Waste Water from Nuclear Facilities with Special Reference to the Public Health Significance of the Proposed Release of Treated Waste Waters at Three Mile Island*

xxi. **National Fire Protection Association (NFPA)**

(1) NFPA FPH SECTION 9-30, *Nuclear Facilities*

xxii. **Standards Association of Australia (SAA)**

(1) SAA AS 1678.2B6, *Emergency Procedure Guide—Transport Group Text EPGs for Class 2 Substances—Compressed and Liquefied Gases Part 2B6: Poisonous, Oxidizing Gas (Fluorine-Type)*

(2) SAA AS 1678.2C4, *Emergency Procedure Guide—Transport Group Text EPGs for Class 2 Substances—Compressed and Liquefied Gases Part 2C4: Non-Flammable, Corrosive, Liquefied Gas (Fluorine-Type)*

2. PACKAGING AND TRANSPORTATION SAFETY

a. **IAEA**

i. **Packaging and Transportation Safety**

(1) *Regulations for the Safe Transport of Radioactive Material—1985 Edition (as Amended 1990)*, Safety Series No. 6

(2) *Regulations for the Safe Transport of Radioactive Material—1996 Edition*, Safety Standards Series No. ST-1/Requirements (DRAFT)

(3) *Explanatory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (1985 Edition)— Second Edition (as Amended 1990)*, Safety Series No. 7

(4) *Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (1985 Edition)—Third Edition (as Amended 1990): A Safety Guide*, Safety Series No. 37

(5) *Schedules of Requirements for the Transport of Specified Types of Radioactive Material Consignments (as Amended 1990)—Companion Document to Safety Series No. 6*, Safety Series No. 80

(6) *Emergency Response Planning and Preparedness for Transport Accidents Involving Radioactive Material*, Safety Series No. 87
(7) *Compliance Assurance for the Safe Transport of Radioactive Material*, Safety Series No. 112
(8) *Quality Assurance for the Safe Transport of Radioactive Material*, Safety Series No.113

b. **CONSENSUS**

i. **ANSI**

(1) ANSI N14.1, *Packaging of Uranium Hexafluoride for Transport*, 1995
(2) ANSI N14.2, *Tiedowns for Transport of Fissile and Radioactive Containers Greater Than One-Ton Truck Transport* (DRAFT)
(3) ANSI N14.5, *Leakage Tests on Packages for Shipment*, 1997
(4) ANSI N14.6, *Special Lifting Devices for Shipping Containers Weighing 10 000 Pounds (4500 kg) or More for Nuclear Materials*, 1993
(5) ANSI N14.23, Design Basis for Resistance to Shock and Vibration of Radioactive Material Packages Greater Than One-Ton in Truck Transport, (DRAFT)
(6) ANSI N14.24, *Domestic Barge Transport for Highway Route Controlled Quantities of Radioactive Materials*, 1985, Rev. 1993
(7) ANSI N14.27, *Carrier and Shipper Responsibilities and Emergency Response Procedures for Highway Transportation Accidents*, 1986
(8) ANSI N14.30, *Design, Fabrication, and Maintenance of Semi-Trailers Employed in the Transport of Weight-Concentrated Radioactive Loads*, 1992
(9) ANSI N14.31, *Standard Tiedowns on Legal Weight Transport System (80,000 lbs) for Packages Containing Hazardous Materials and Weighing Greater Than 500 Pounds* (DRAFT)
(10) ANSI N14.32, *Gas Generation in Packages Used for the Storage or Transport of Radioactive Materials* (DRAFT)

ii. **National Board of Boiler and Pressure Vessel Inspectors (NBBP)**

(1) NBBP NB-23, *National Board Inspection Code,*1998

3. STORAGE FACILITY

a. **IAEA**

i. **Predisposal Management**

(1) *Management of Radioactive Wastes Produced by Users of Radioactive Materials*, Safety Series No. 70
(2) *The Regulatory Process for the Decommissioning of Nuclear Facilities*, Safety Series No. 105
(3) *Pre-Disposal Management of Radioactive Waste (Including Decommissioning)* (DRAFT), NS152
(4) *Pre-Disposal Management of Low and Intermediate Level Waste from Nuclear Fuel Cycle Facilities* (DRAFT), NS159
(5) *Pre-Disposal Management of Radioactive Waste from Medicine, Industry, and Research* (DRAFT), NS160
(6) *Decommissioning of Nuclear Fuel Cycle Facilities* (DRAFT), NS171
(7) *Safety Assessment for Pre-Disposal Waste Management* (DRAFT), NS284

ii. **DOE**

(1) DOE Order 151.1, *Comprehensive Emergency Management*

(2) DOE Order 421.1, *DOE Good Practices Guide*
(3) DOE Order 5660.1B, *Management of Nuclear Materials*
(4) DOE Order 5820.2B, *Radioactive Waste Management*

b. **STATE**
i. **Kentucky**
(1) *Building Officials and Code Administrators International, Inc.,* Kentucky Building Code, 1997
ii. **Ohio**
(1) *Building Officials and Code Administrators International, Inc.,* Kentucky Building Code with Ohio Elevator Code, 1999

4. REUSE
a. **IAEA**
i. *Consumer Products Containing Radioactive Substances* (DRAFT), NS31
ii. *Application of the Principles of Radiation Protection to Chronic Exposure Situations* (DRAFT), NS51
iii. *Application of Exemption Principles to the Recycle and Reuse of Materials from Nuclear Facilities: A Safety Practice*, Safety Series No. 111-P-1.1
iv. *Rehabilitation of Contaminated Areas in Intervention Situations* (DRAFT), NS162
v. *Rehabilitation of Areas with Contamination from Past Activities and Accidents in Intervention Situations* (DRAFT), NS172
vi. *Recycling and Reuse of Scrap Metals, A Report by a Task Group of the NEA Co-Operative Programme on Decommissioning Language: English*, Printed: 1996, NEA#0149

b. **FEDERAL**
i. **DOE**
(1) DOE Order 435.1, *Radioactive Waste Management*
(2) DOE Order 5820.2, *Radioactive Waste Management*

c. **STATE**
i. **Kentucky**
(1) None
ii. **Ohio**
(1) None
iii. **Tennessee**
(1) None
iv. **Nevada**
(1) None

5. NEAR-SURFACE DISPOSAL FACILITY
a. **IAEA**
i. *Shallow Ground Disposal of Radioactive Wastes: A Guidebook*, Safety Series No. 53
ii. *Generic Models and Parameters for Assessing the Environmental Transfer of Radionuclides from Routine Releases: Exposures of Critical Groups*, Safety Series No. 57
iii. *Design, Construction, Operation, Shutdown and Surveillance of Repositories for Solid Radioactive Wastes in Shallow Ground*, Safety Series No. 63
iv. *Safety Analysis Methodologies for Radioactive Waste Repositories in Shallow Ground*, Safety Series No. 64
v. *Acceptance Criteria for Disposal of Radioactive Wastes in Shallow Ground and Rock*

Cavities, Safety Series No. 71

vi. *Siting of Near Surface Disposal Facilities (1994)*, 111-G-3.1

vii. *Near Surface Disposal of Radioactive Wastes* (DRAFT), NS153

viii. D*esign, Construction, Operation, and Closure of Near Surface Repositories* (DRAFT),

ix. *Safety Standard Series No. WS-R-1: Near Surface Disposal of Radioactive Waste Safety Requirements*

b. **FEDERAL**

i. **DOE**

(1) DOE Order 435.1, *Radioactive Waste Management*

(2) DOE Order 5820.2, *Radioactive Waste Management*

c. **CONSENSUS**

i. **American Nuclear Society (ANS)**

(1) ANSI/ANS 40.35-1991, *Volume Reduction of Low Level Radioactive Waste*

6. GEOLOGIC DISPOSAL FACILITY

a. **IAEA**

i. *Underground Disposal of Radioactive Wastes: Basic Guidance*, Safety Series No. 54

ii. *Safety Assessment for the Underground Disposal of Radioactive Wastes*, Safety Series No. 56

iii. *Generic Models and Parameters for Assessing the Environmental Transfer of Radionuclides from Routine Releases: Exposures of Critical Groups*, Safety Series No. 57

iv. *Concepts and Examples of Safety Analyses for Radioactive Waste Repositories in Continental Geological Formations*, Safety Series No. 58

v. *Disposal of Low and Intermediate Level Solid Radioactive Wastes in Rock Cavities*, Safety Series No. 59

vi. *Criteria for Underground Disposal of Solid Radioactive Wastes*, Safety Series No. 60

vii. *Site Investigations, Design, Construction, Operation, Shutdown and Surveillance of Repositories for Low and Intermediate Level Radioactive Wastes in Rock Cavities*, Safety Series No. 62

viii. *Performance Assessment for Underground Radioactive Waste Disposal Systems*, Safety Series No. 68

ix. *Guidance for Regulation of Underground Repositories for Disposal of Radioactive Wastes*, Safety Series No. 96

x. *Safety Principles and Technical Criteria for the Underground Disposal of High Level Radioactive Waste (1989)*, Safety Series No. 99

xi. *Siting of Geological Disposal Facilities (1994)*, Safety Series No. 111-G-4.1

xii. *Design, Construction, Operation, and Closure of Geological Repositories* (DRAFT), NS168

xiii. *Safety Assessment for Geological Disposal* (DRAFT), NS169

b. **FEDERAL**

i. **DOE**

(1) DOE Order 435.1, *Radioactive Waste Management*

(2) DOE Order 5820.2, *Radioactive Waste Management*

c. **CONSENSUS**

i. **American Nuclear Society (ANS)**

(1) ANSI/ANS 40.35-1991, *Volume Reduction of Low Level Radioactive Waste*

7. CONVERSION MATERIALS

a. CONSENSUS

i. American Society for Testing and Materials (ASTM)

(1) ASTM C696, *Standard Test Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Uranium Dioxide Powders and Pellets E11994*

(2) ASTM C753, *Standard Specification for Nuclear-Grade, Sinterable Uranium Dioxide Powder*

(3) ASTM C761, *Standard Test Methods for Chemical, Mass Spectrometric, Spectrochemical, Nuclear, and Radiochemical Analysis of Uranium Hexafluoride*

(4) ASTM C788, *Standard Specification for Nuclear-Grade Uranyl Nitrate Solution*

(5) ASTM C799, *Standard Test Methods for Chemical, Mass Spectrometric, Spectrochemical, Nuclear, and Radiochemical Analysis of Nuclear-Grade Uranyl Nitrate Solutions*

(6) ASTM C1334, *Standard Specification for Uranium Oxides with a 235U Content of Less Than 5% for Dissolution Prior to Conversion to Nuclear-Grade Uranium Dioxide*

(7) ASTM C1348, *Standard Specification for Blended Uranium Oxides with a 235U Content of Less Than 5 % for Direct Hydrogen Reduction to Nuclear Grade Uranium Dioxide*

REFERENCES

DOE/EIS-0269, *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride*, U.S. Department of Energy, Washington, D.C., April 1999.

Office of Nuclear Energy, Science and Technology, *Final Plan for the Conversion of Depleted Uranium Hexafluoride*, U.S. Department of Energy, Washington, D.C., July 1999.

APPENDIX A
FUNDAMENTALS (POLICIES, OBJECTIVES)

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FUNDAMENTALS (POLICIES, OBJECTIVES)

This section, Appendix A, contains fundamentals, policy, and objectives documents for each phase of the conversion process by regulatory authority.

1. CONVERSION FACILITY

a. **IAEA**

i. **Safety Fundamentals**

(1) *The Safety of Nuclear Installations*, Safety Series No. 110

(2) *The Principles of Radioactive Waste Management*, Safety Series No. 111-F

(3) *Radiation Protection and the Safety of Radiation Sources: A Safety Fundamental*, Safety Series No. 120

b. **FEDERAL**

i. **DOE**

(1) DOE Policy 441.1, *DOE Radiological Health and Safety Policy*

(2) DOE Policy 450.1, *Environment, Safety, and Health Policy for the Department of Energy Complex*

(3) DOE Policy 450.2A, *Identifying, Implementing and Complying with ES&H Requirements*

(4) DOE Policy 450.3, *Authorizing Use of the Necessary and Sufficient Process for Standards-Based ES&H*

(5) DOE Policy 450.4, *Safety Management System Policy*

(6) DOE Policy 450.5, *Line Environment, Safety and Health Oversight*

(7) DOE Policy 450.6, *Secretarial, Policy Statement Environment, Safety and Health*

c. **CONSENSUS**

i. **American National Standards Institute (ANSI)**

(1) ANSI N15.41, *Nuclear Facilities—Derivation of Measurement Control Programs—General Principles*

APPENDIX B
GUIDES

APPENDIX B
GUIDES

This section, Appendix B, contains guidance and standards documents for each phase of the conversion process by regulatory authority.

1. CONVERSION FACILITY

a. IAEA

i. Quality Assurance

(1) *Quality Assurance for Safety in Nuclear Power Plants and Other Nuclear Installation*, Supporting Safety Guides 50-SG-Q1-Q14 (1996)

(2) IAEA 50-SG-QA11, *Quality Assurance in the Procurement, Design and Manufacture of Nuclear Fuel Assemblies: A Safety Guide*

ii. Radiation Safety

(1) *Principles for Limiting Releases of Radioactive Effluents into the Environment: A Safety Guide*, Safety Series No. 77

b. FEDERAL

i. NRC

(1) Reg. Guide 3.7, *Monitoring of Combustible Gases and Vapors in Plutonium Processing and Fuel Fabrication Plants*

(2) Reg. Guide 3.10, *Liquid Waste Treatment System Design Guide for Plutonium Processing and Fuel Fabrication Plants*

(3) Reg. Guide 3.12, *General Design Guide for Ventilation Systems of Plutonium Processing and Fuel Fabrication Plants*

(4) Reg. Guide 3.13, *Guide for Acceptable Waste Storage Methods at UF6 Production Plants*

(5) Reg. Guide 3.14, *Seismic Design Classification for Plutonium Processing and Fuel Fabrication Plants*

(6) Reg. Guide 3.15, *Standard Format and Content of License Applications for Storage Only of Unirradiated Power Reactor Fuel and Associated Radioactive Material* (Draft CE 219-4, Proposed Revision 1, published August 1982)

(7) Reg. Guide 3.16, *General Fire Protection Guide for Plutonium Processing and Fuel Fabrication Plants*

(8) Reg. Guide 3.21, *Quality Assurance Requirements for Protective Coatings Applied to Fuel Reprocessing and to Plutonium Processing and Fuel Fabrication Plants*

(9) Reg. Guide 3.28, *Welder Qualification for Welding in Areas of Limited Accessibility in Fuel Reprocessing Plants and in Plutonium Processing and Fuel Fabrication Plants*

(10) Reg. Guide 3.29, *Preheat and Interpass Temperature Control for the Welding of Low-Alloy Steel for Use in Fuel Reprocessing Plants and in Plutonium Processing and Fuel Fabrication Plants*

(11) Reg. Guide 3.40, *Design Basis Floods for Fuel Reprocessing Plants and for Plutonium Processing and Fuel Fabrication Plants*

(12) Reg. Guide 3.42, *Emergency Planning for Fuel Cycle Facilities and Plants Licensed Under 10 CFR Parts 50 and 70 1,* September 1979

(13) Reg. Guide 3.52, *Standard Format and Content for the Health and Safety Sections of License Renewal Applications for Uranium Processing and Fuel Fabrication* (Draft FP 716-4 published October 1980) (Draft CE 308-4, Proposed Revision 1, published July 1985)

(14) Reg. Guide 3.55, *Standard Format and Content for the Health and Safety Sections of License Renewal Applications for Uranium Hexafluoride Production* (Draft CE 227-4 published January 1984)

(15) Reg. Guide 3.63, *Onsite Meteorological Measurement Program for Uranium Recovery Facilities—Data Acquisition and Reporting* (Draft ES 401-4 published September 1985)

(16) Reg. Guide 3.65, *Standard Format and Content of Decommissioning Plans for Licensees Under 10 CFR Parts 30, 40, and 70* (Draft CE 304-4 published December 1985)

(17) Reg. *Guide 3.67, Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities* (Draft DG-3005 published September 1990)

(18) Reg. Guide 3.69, *Topical Guidelines for the Licensing Support System* (Draft DG-3009 published July 1993)

(19) Reg. Guide 3.71, *Nuclear Criticality Safety Standards for Fuels and Material Facilities* (Draft DG-3013 published January 1998) (Guide withdraws Regulatory Guides 3.1, 3.4, 3.43, 3.45, 3.47, 3.57, 3.58, 3.68, 3.70, and 8.12)

(20) DG-3001, *Records Important for Decommissioning for Licensees Under 10 CFR Parts 30, 40, 70, and 72*

(21) DG-3006, *Standard Format and Content for Fire Protection Sections of License Applications for Fuel Cycle Facilities*

(22) Reg. Guide 4.5, *Measurements of Radionuclides in the Environment—Sampling and Analysis of Plutonium in Soil*

(23) Reg. Guide 4.6, *Measurements of Radionuclides in the Environment—Strontium-89 and Strontium-90 Analyses*

(24) Reg. Guide 4.13, *Performance, Testing, and Procedural Specifications for Thermoluminescence Dosimetry: Environmental Applications*

(25) Reg. Guide 4.15, *Quality Assurance for Radiological Monitoring Programs (Normal Operations)—Effluent Streams and the Environment*

(26) Reg. Guide 4.16, *Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluents from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants* (Draft CE 401-4, Proposed Revision 1, published September 1984) (Errata published August 1986)

(27) Reg. Guide 4.17, *Standard Format and Content of Site Characterization Plans for High-Level-Waste Geologic Repositories* (Draft GS 027-4 published April 1981) (Draft WM 404-4, Proposed Revision 1, published February 1985)

(28) Reg. Guide 4.18, *Standard Format and Content of Environmental Reports for Near-Surface Disposal of Radioactive Waste* (Draft WM 013-4 published April 1982)

(29) Reg. Guide 4.19, *Guidance for Selecting Sites for Near-Surface Disposal of Low-Level Radioactive Waste* (Draft WM 408-4 published March 1987)

(30) Reg. Guide 4.20, *Constraint on Releases of Airborne Radioactive Materials to the Environment for Licensees Other Than Power Reactors* (Draft DG-8016 published December 1995)

(31) DG-4006, *Demonstrating Compliance with the Radiological Criteria for License Termination*
(32) Reg. Guide 5.3, *Statistical Terminology and Notation for Special Nuclear Materials Control and Accountability*
(33) Reg. Guide 5.4, *Standard Analytical Methods for the Measurement of Uranium Tetrafluoride (UF4) and Uranium Hexafluoride (UF6)*
(34) Reg. Guide 5.5, *Standard Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Uranium Dioxide Powders and Pellets*
(35) Reg. Guide 5.10, *Selection and Use of Pressure-Sensitive Seals on Containers for Onsite Storage of Special Nuclear Material*
(36) Reg. Guide 5.11, *Nondestructive Assay of Special Nuclear Material Contained in Scrap and Waste* (Draft SG 043-4, Proposed Revision 1, published November 1982)
(37) Reg. Guide 5.12, *General Use of Locks in the Protection and Control of Facilities and Special Nuclear Materials*
(38) Reg. Guide 5.13, *Conduct of Nuclear Material Physical Inventories*
(39) Reg. Guide 5.15, *Tamper-Indicating Seals for the Protection and Control of Special Nuclear Material* (Draft DG-5005, Proposed Revision 1, published January 1996)
(40) Reg. Guide 5.17, *Truck Identification Markings*
(41) Reg. Guide 5.18, *Limit of Error Concepts and Principles of Calculation in Nuclear Materials Control*
(42) Reg. Guide 5.20, *Training, Equipping, and Qualifying of Guards and Watchmen*
(43) Reg. Guide 5.21, *Nondestructive Uranium-235 Enrichment Assay by Gamma Ray Spectrometry* (Draft SG 044-4, Proposed Revision 1, published June 1982)
(44) Reg. Guide 5.22, *Assessment of the Assumption of Normality (Employing Individual Observed Values)*
(45) Reg. Guide 5.23, *In Situ Assay of Plutonium Residual Holdup* (Draft SG 045-4, Proposed Revision 1, published October 1982)
(46) Reg. Guide 5.25, *Design Considerations for Minimizing Residual Holdup of Special Nuclear Material in Equipment for Wet Process Operations*
(47) Reg. Guide 5.26, *Selection of Material Balance Areas and Item Control Areas*
(48) Reg. Guide 5.33, *Statistical Evaluation of Material Unaccounted For*
(49) Reg. Guide 5.34, *Nondestructive Assay for Plutonium in Scrap Material by Spontaneous Fission Detection* (Draft SG 046-4, Proposed Revision 1, published June 1982)
(50) Reg. Guide 5.36, *Recommended Practice for Dealing with Outlying Observations*
(51) Reg. Guide 5.37, *In Situ Assay of Enriched Uranium Residual Holdup* (Draft SG 047-4, Proposed Revision 1, published August 1982)
(52) Reg. Guide 5.39, *General Methods for the Analysis of Uranyl Nitrate Solutions for Assay, Isotopic Distribution, and Impurity Determinations*
(53) Reg. Guide 5.42, *Design Considerations for Minimizing Residual Holdup of Special Nuclear Material in Equipment for Dry Process Operations*
(54) Reg. Guide 5.48, *Design Considerations—Systems for Measuring the Mass of Liquids*
(55) Reg. Guide 5.51, *Management Review of Nuclear Material Control and Accounting Systems* (for Comment)
(56) Reg. Guide 5.53, *Qualification, Calibration, and Error Estimation Methods for Nondestructive Assay* (Draft SG 049-4, Proposed Revision 1, published June 1982)

(57) Reg. Guide 5.55, *Standard Format and Content of Safeguards Contingency Plans for Fuel Cycle Facilities* (for Comment)
(58) Reg. Guide 5.58, *Considerations for Establishing Traceability of Special Nuclear Material Accounting Measurements*
(59) Reg. Guide 5.61, *Intent and Scope of the Physical Protection Upgrade Rule Requirements for Fixed Sites*
(60) Reg. Guide 5.62, *Reporting of Safeguards Events* (Draft SG 901-4 published October 1979) (Draft SG 901-4, Proposed Revision 1, published October 1985) (Draft DG-5008, Proposed Revision 2, published December 1997)
(61) Reg. Guide 8.1, *Radiation Symbol*
(62) Reg. Guide 8.2, *Guide for Administrative Practices in Radiation Monitoring*
(63) Reg. Guide 8.4, *Direct-Reading and Indirect-Reading Pocket Dosimeters*
(64) Reg. Guide 8.5, *Criticality and Other Interior Evacuation Signals*
(65) Reg. Guide 8.6, *Standard Test Procedure for Geiger-Muller Counters*
(66) Reg. Guide 8.7, *Instructions for Recording and Reporting Occupational Radiation Exposure Data* (Draft DG-8007, Proposed Revision 1, published November 1991)
(67) Reg. Guide 8.9, *Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program* (Draft DG-8009, Proposed Revision 1, published December 1991)
(68) Reg. Guide 8.10, *Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable*
(69) Reg. Guide 8.11, *Applications of Bioassay for Uranium*
(70) Reg. Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure* (Draft OP 031-4, Proposed Revision 2, published August 1981) (Draft DG-8014, Proposed Revision 3, published October 1994)
(71) Reg. Guide 8.14, *Personnel Neutron Dosimeters* (Draft OH 940-4, Proposed Revision 2, published February 1980)
(72) Reg. Guide 8.15, *Acceptable Programs for Respiratory Protection* (Draft DG-8022, Proposed Revision 1, issued July 1998)
(73) Reg. Guide 8.20, *Applications of Bioassay for I-125 and I-131*
(74) Reg. Guide 8.21, *Health Physics Surveys for Byproduct Material at NRC-Licensed Processing and Manufacturing Plants*
(75) Reg. Guide 8.24, *Health Physics Surveys During Enriched Uranium-235 Processing and Fuel Fabrication*
(76) Reg. Guide 8.25, *Air Sampling in the Workplace* (Draft OH 905-4 published October 1979) (Draft DG-8003, Proposed Revision 1, published September 1991)
(77) Reg. Guide 8.26, *Applications of Bioassay for Fission and Activation Products* (Draft OH 714-4 published August 1979)
(78) Reg. Guide 8.28, *Audible-Alarm Dosimeters* (Draft OH 804-4 published August 1979)
(79) Reg. Guide 8.29, *Instruction Concerning Risks from Occupational Radiation Exposure* (Draft OH 902-4 published May 1980) (Draft DG-8012, Proposed Revision 1, published December 1994)
(80) Reg. Guide 8.33, *Quality Management Program* (Draft DG-8001 published January 1990)
(81) Reg. Guide 8.34, *Monitoring Criteria and Methods to Calculate Occupational Radiation Doses* (Draft DG-8010 published February 1992)

(82) Reg. Guide 8.35, *Planned Special Exposures* (Draft DG-8008 published December 1991)
(83) Reg. Guide 8.36, *Radiation Dose to the Embryo/Fetus* (Draft DG-8011 published February 1992)
(84) Reg. Guide 8.37, *ALARA Levels for Effluents from Materials Facilities* (Draft DG-8013 published October 1992) (Draft DG-8016, Proposed Revision 1, published December 1995)
(85) DG-8022, (Proposed Revision 1 to R.G. 8.15) *Acceptable Programs for Respiratory Protection*
(86) OH 940-4, (Proposed Revision 2 to Regulatory Guide 8.14) *Personnel Neutron Dosimeters*
(87) OP 032-5, *Test and Calibration of Radiation Protection Instrumentation*
(88) OP 722-4, *Qualifications for the Radiation Safety Officer in a Large-Scale Non-Fuel-Cycle Radionuclide Program*
(89) Reg. Guide 10.1, *Compilation of Reporting Requirements for Persons Subject to NRC Regulations*, NUREG-1460, Rev. 1, July 1994
(90) Reg. Guide 10.4, *Guide for the Preparation of Applications for Licenses to Process Source Material* (Errata published July 1984) (Draft FC 409-4, Proposed Revision 2, published April 1985)
(91) Reg. Guide 10.5, *Applications for Type A Licenses of Broad Scope* (Errata published July 1984) (Draft FC 408-4, Proposed Revision 2, published February 1985) (Draft DG-0005, Second Proposed Revision 2, published October 1994)
(92) Reg. Guide 10.7, *Guide for the Preparation of Applications for Licenses for Laboratory and Industrial Use of Small Quantities of Byproduct Material* (Errata published July 1984)
(93) DG-0005, (Second Proposed Revision 2 to Regulatory Guide 10.5) *Applications for Licenses of Broad Scope*
(94) FC 408-4, (Proposed Revision 2 to Regulatory Guide 10.5) *Guide for the Preparation of Applications for Type A Licenses of Broad Scope (see DG-0005)*
(95) FC 413-4, *Guide for the Preparation of Applications for Licenses for the Use of Radioactive Materials in Calibrating Radiation Survey and Monitoring Instruments*

c. **CONSENSUS**

i. **American National Standards Institute (ANSI)**

(1) ANSI N13.1, *Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities*
(2) ANSI N13.2, *Administrative Practices in Radiation Monitoring, Guide*
(3) ANSI N14.29, *Radioactive Materials—Guide for Writing Operating Manuals for Packaging Revision and Redesignation of ANSI N679-76*
(4) ANSI N15.28-1991, *Nuclear Materials Control—Guide for Qualification and Certification of Safeguards and Security Personnel*
(5) ANSI N15.37-1981, *Automation of Nondestructive Assay Systems for Nuclear Materials Control, Guide to*

ii. **American Nuclear Society (ANS)**

(1) ANS 8.7, *Guide for Nuclear Criticality Safety in the Storage of Fissile Materials*

iii. **American Society for Testing and Materials (ASTM)**

(1) ASTM C986, *Standard Guide for Developing Training Programs in the Nuclear Fuel Cycle*

(2) ASTM C1009, *Standard Guide for Establishing a Quality Assurance Program for Analytical Chemistry Laboratories within the Nuclear Industry E1—1997*
(3) ASTM C1068, *Standard Guide for Qualification of Measurement Methods by a Laboratory within the Nuclear Industry E1—1997 Coupled Plasma-Atomic Emission Spectrometry*
(4) ASTM C1112, *Standard Guide for Application of Radiation Monitors to the Control and Physical Security of Special Nuclear Material*
(5) ASTM C1128, *Standard Guide for Preparation of Working Reference Materials for Use in the Analysis of Nuclear Fuel Cycle Materials E1—1997*
(6) ASTM C1156, *Standard Guide for Establishing Calibration for a Measurement Method Used to Analyze Nuclear Fuel Cycle Materials E1—1997*
(7) ASTM C1210, *Standard Guide for Establishing a Measurement System Quality Control Program for Analytical Chemistry Laboratories within the Nuclear Industry E1—1997*
(8) ASTM C1215, *Standard Guide for Preparing and Interpreting Precision and Bias Statements in Test Method Standards Used in the Nuclear Industry*
(9) ASTM C1217, *Standard Guide for Design of Equipment for Processing Nuclear and Radioactive Materials*
(10) ASTM C1297, *Standard Guide for Qualification of Laboratory Analysts for the Analysis of Nuclear Fuel Cycle Materials E1—1997*
(11) ASTM D5144, *Standard Guide for Use of Protective Coating Standards in Nuclear Power Plants Replaces D3842-86*
(12) ASTM D5163, *Standard Guide for Establishing Procedures to Monitor the Performance of Safety Related Coatings in an Operating Nuclear Power Plant*
(13) ASTM D5498, *Standard Guide for Developing a Training Program for Coating Work Inspectors in Nuclear Facilities*
(14) ASTM D5962, *Standard Guide for Maintaining Unqualified Coatings (Paints) Within Level I Areas of a Nuclear Power Facility*
(15) ASTM E1168, *Standard Guide for Radiological Protection Training for Nuclear Facility Workers*
(16) ASTM E1281, *Standard Guide for Nuclear Facility Decommissioning Plans*
(17) ASTM E1819, *Standard Guide for Environmental Monitoring Plans for Decommissioning of Nuclear Facilities*
(18) ASTM E1892, *Standard Guide for Preparing Characterization Plans for Decommissioning Nuclear Facilities*

iv. **Chemical Manufacturers Association (CMA)**
(1) CMA 022002, *Evaluating Process Safety in the Chemical Industry: A Manager's Guide to Quantitative Risk Assessment*

2. PACKAGING AND TRANSPORTATION SAFETY

a. **IAEA**

i. **Packaging and Transportation Safety**
(1) *HYPERTRANS! A Hypertext Guide to the IAEA Transport Regulations*, Safety Series Nos. 6, 7, 37, and 80

b. **FEDERAL**

i. **NRC**

(1) Reg. Guide 5.56, *Standard Format and Content of Safeguards Contingency Plans for Transportation* (for Comment)

(2) Reg. Guide 5.63, *Physical Protection for Transient Shipments* (Draft SG 126-4 published September 1981)

(3) Reg. Guide 7.1, *Administrative Guide for Packaging and Transporting Radioactive Material*

(4) Reg. Guide 7.2, *Packaging and Transportation of Radioactively Contaminated Biological Materials*

(5) Reg. Guide 7.3, *Procedures for Picking Up and Receiving Packages of Radioactive Material*

(6) Reg. Guide 7.4, *Leakage Tests on Packages for Shipment of Radioactive Materials*

(7) Reg. Guide 7.5, *Administrative Guide for Obtaining Exemptions from Certain NRC Requirements Over Radioactive Material Shipments*

(8) Reg. Guide 7.6, *Design Criteria for the Structural Analysis of Shipping Cask Containment Vessels*

(9) Reg. Guide 7.7, *Administrative Guide for Verifying Compliance with Packaging Requirements for Shipments of Radioactive Materials* (for Comment)

(10) Reg. Guide 7.8, *Load Combinations for the Structural Analysis of Shipping Casks for Radioactive Material* (Draft MS 527-4, Proposed Revision 1, published July 1987) (Draft MS 804-4, Second Proposed Revision 1, published September 1988)

(11) Reg. Guide 7.9, *Standard Format and Content of Part 71 Applications for Approval of Packaging of Type B, Large Quantity, and Fissile Radioactive Material* (Draft FC 416-4, Proposed Revision 2, published May 1986)

(12) Reg. Guide 7.10, *Establishing Quality Assurance Programs for Packaging Used in the Transport of Radioactive Material* (Combined Draft TP 019-4, published June 1981, and Draft TP 020-4, published March 1981)

(13) FC 416-4, (Proposed Revision 2 to Regulatory Guide 7.9) *Standard Format and Content of Part 71 Applications for Approval of Packaging for Radioactive Material*

(14) TP 914-4, *Measurement of Radiation Levels on Surfaces of Packages of Radioactive Materials*

3. STORAGE FACILITY

a. **FEDERAL**

i. **NRC**

(1) Reg. Guide 6.6, *Acceptance Sampling Procedures for Exempted and Generally Licensed Items Containing Byproduct Material*

(2) Reg. Guide 6.7, *Preparation of an Environmental Report to Support a Rule Making Petition Seeking an Exemption for a Radionuclide-Containing Product*

(3) Reg. Guide 6.9, *Establishing Quality Assurance Programs for the Manufacture and Distribution of Sealed Sources and Devices Containing Byproduct Material* (Draft DG-6002 published May 1994)

ii. **DOE**

(1) DOE G 441.1-9, *Radioactive Contamination Control Guide for Use with Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection*

b. **CONSENSUS**

i. **American Nuclear Society (ANS)**

(1) ANSI/ANS 40.35-1991, *Volume Reduction of Low Level Radioactive Waste*

ii. **American Society for Testing and Materials (ASTM)**

(1) ASTM D4537, *Standard Guide for Establishing Procedures to Qualify and Certify Inspection Personnel for Coating Work in Nuclear Facilities*

(2) ASTM D4228, *Standard Practice for Qualification of Coating Applicators for Application of Coatings to Steel Surfaces*

(3) ASTM D5962, *Standard Guide for Maintaining Unqualified Coatings (Paints) Within Level I Areas*

APPENDIX C
SAFETY REPORTS

APPENDIX C
SAFETY REPORTS

This section, Appendix C, contains safety and technical reports documents for each phase of the conversion process by regulatory authority.

1. CONVERSION FACILITY

a. IAEA

i. Quality Assurance

(1) *Defence in Depth in Nuclear Safety—A Report by the International Nuclear Safety Advisory Group,* INSAG Series No. 10

(2) *Manual on Training, Qualification and Certification of Quality Assurance Personnel,* Technical Reports Series No. 262

(3) *Manual on Maintenance of Systems and Components Important to Safety,* Technical Reports Series No. 268

(4) *Regulatory Inspection of the Implementation of Quality Assurance Programmes: A Manual,* Technical Reports Series No. 296

(5) *Implementation of Quality Assurance Corrective Actions: A Manual,* Technical Reports Series No. 317

(6) *Grading of Quality Assurance Requirements: A Manual,* Technical Reports Series No. 328

ii. Radiation Safety

(1) *Diagnosis and Treatment of Radiation Injuries,* Safety Reports Series No. 2

(2) *Potential Exposure in Nuclear Safety—A Report by the International Nuclear Safety Advisory Group,* INSAG Series No. 9

(3) *Planning the Medical Response to Radiological Accidents,* Safety Reports Series No. 4

(4) *Defence in Depth in Nuclear Safety—A Report by the International Nuclear Safety Advisory Group,* INSAG Series No. 10

(5) *Direct Methods for Measuring Radionuclides in the Human Body: A Safety Practice,* Safety Series No. 114

(6) *Neutron Monitoring for Radiological Protection,* Technical Reports Series No. 252

(7) *Methods for Reducing Occupational Exposures During the Decommissioning of Nuclear Facilities,* Technical Reports Series No. 278

(8) *Measurement of Radionuclides in Food and the Environment: A Guidebook,* Technical Reports Series No. 295

(9) *Cleanup of Large Areas Contaminated as a Result of a Nuclear Accident,* Technical Reports Series No. 300

(10) *Guidelines for Agricultural Countermeasures Following an Accidental Release of Radionuclides,* Technical Reports Series No. 363

iii. Nuclear Safeguards

(1) As of 1997 IAEA had 108,648 metric tons of depleted uranium under safeguards. This corresponds to approximately 9,000 14-ton U.S. cylinders of UF_6. It is not known how many, if any, of the DOE inventory of 46,422 14-ton cylinders are under IAEA safeguards.

iv. **DOE**

(1) *Summary of the Long Term Engineering Analysis Report for the Long Term Management of Uranium Hexafluoride,* J. W. Dubrin & L. Rahm-Crites, UCRL-ID-124080, Lawrence Livermore National Laboratory

2. PACKAGING AND TRANSPORTATION SAFETY

a. **IAEA**

i. **Packaging and Transportation Safety**

(1) *Characterization of Radioactive Waste Forms and Packages,* Technical Reports Series No. 383

3. STORAGE FACILITY

a. **IAEA**

i. **Predisposal Management**

(1) *Decontamination of Nuclear Facilities to Permit Operation, Inspection, Maintenance, Modification or Plant Decommissioning*, Technical Reports Series No. 249

(2) *Methodology and Technology of Decommissioning Nuclear Facilities*, Technical Reports Series No. 267

4. REUSE

a. **IAEA**

i. *Factors Relevant to the Recycling or Reuse of Components Arising from the Decommissioning and Refurbishment of Nuclear Facilities,* Technical Reports Series No. 293

5. NEAR-SURFACE DISPOSAL FACILITY

a. **IAEA**

i. *Evaluating the Reliability of Predictions Made Using Environmental Transfer Models: A Safety Practice,* Safety Series No. 100

ii. *Site Investigations for Repositories for Solid Radioactive Wastes in Shallow Ground*, Technical Reports Series No. 216

iii. *Operational Experience in Shallow Ground Disposal of Radioactive Wastes*, Technical Reports Series No. 253

iv. *Natural Analogues in Performance Assessments for the Disposal of Long Lived Radioactive Wastes,* Technical Reports Series No. 304

v. *Containers for Packaging of Solid and Intermediate Level Radioactive Wastes Technical Reports,* Series No. 355

vi. *Handbook of Parameter Values for the Prediction of Radionuclide Transfer in Temperate Environments,* Technical Reports Series No. 364

6. GEOLOGIC DISPOSAL FACILITY

a. **IAEA**

i. *Evaluating the Reliability of Predictions Made Using Environmental Transfer Models: A Safety Practice*, Safety Series No. 100

ii. *Site Investigations for Repositories for Solid Radioactive Wastes in Deep Continental Geological Formations,* Technical Reports Series No. 215

iii. *Disposal of Radioactive Grouts into Hydraulically Fractured Shale,* Technical Reports Series No. 232
iv. *Deep Underground Disposal of Radioactive Wastes: Near-Field Effects*, Technical Reports Series No. 251
v. *Techniques for Site Investigations for Underground Disposal of Radioactive Wastes*, Technical Reports Series No. 256
vi. *Natural Analogues in Performance Assessments for the Disposal of Long Lived Radioactive Wastes*, Technical Reports Series No. 304
vii. *Sealing of Underground Repositories for Radioactive Wastes*, Technical Reports Series No. 319
viii. *Containers for Packaging of Solid and Intermediate Level Radioactive Wastes*, Technical Reports, Series No. 355
ix. *Handbook of Parameter Values for the Prediction of Radionuclide Transfer in Temperate Environments*, Technical Reports Series No. 364

INTERNAL DISTRIBUTION

1. J. M. Begovich
2. J. B. Clendenen
3. A. G. Croff
4. J. R. Hightower, Jr.
5. R. F. Holdaway
6. G. T. Mays
7. R. J. Moses
8. A. B. Poole
9. L. B. Shappert
10. J. R. Trabalka
11. D. E. Welch
12. K. A. Williams
13. Central Research Library
14. ORNL Laboratory Records–RC
15. ORNL Laboratory Records–OSTI (Lab Records handles distribution to OSTI; no external distribution to OSTI is required.)

EXTERNAL DISTRIBUTION

16. R. R. Price, U.S. Department of Energy, Office of Space and Defense Power Systems, NE-50, Germantown, MD 20874-1290