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Standard Guide for Nuclear Facility Decommissioning Plans¹

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INTRODUCTION

As a nuclear facility approaches the end of its operational life, the operator should initiate final preparations for decommissioning. As part of this program, a decommissioning plan should be developed to comply with applicable federal and state requirements and regulations, as well as to provide generic and detailed information relevant to decommissioning project planning. This standard is a guideline for the preparation and content of the decommissioning plan.

1. Scope

1.1 This guide applies to decommissioning plans for any nuclear facility whose operation was (is) governed by Nuclear Regulatory Commission (NRC), Agreement State license, under Department of Energy (DOE) orders, or whose operation was overseen by another federal, state, or local agency.

1.2 The guide applies to the preparation and content of the decommissioning plan document itself.

1.3 The detailed description and development of implementation plans identified in Section 4 is outside the scope of this guide.

NOTE 1—Nuclear facilities operated by the U.S. DOE are not licensed by the U.S. NRC, nor are other nuclear facilities which may come under the control of the U.S. Department of Defense or individual agreement states. The references in this guide to licensee, U.S. NRC Regulatory guides, and Title 10 of the U.S. *Code of Federal Regulations* are to imply appropriate alternative nomenclature with respect to DOE, DOD, or agreement state nuclear facilities. This distinction should not alter the content of decommissioning plans for nuclear facilities.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recom-*

mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 ASTM Standards:²

E1034 Specification for Nuclear Facility Transient Worker Records

E1167 Guide for Radiation Protection Program for Decommissioning Operations

E1168 Guide for Radiological Protection Training for Nuclear Facility Workers

E1760 Guide for Unrestricted Disposition of Bulk Materials Containing Residual Amounts of Radioactivity

E1819 Guide for Environmental Monitoring Plans for Decommissioning of Nuclear Facilities

E1892 Guide for Preparing Characterization Plans for Decommissioning Nuclear Facilities

E1893 Guide for Selection and Use of Portable Radiological Survey Instruments for Performing In Situ Radiological Assessments to Support Unrestricted Release from Further Regulatory Controls

E2216 Guide for Evaluating Disposal Options for Concrete from Nuclear Facility Decommissioning

E2420 Guide for Post-Deactivation Surveillance and Maintenance of Radiologically Contaminated Facilities

E2421 Guide for Preparing Waste Management Plans for Decommissioning Nuclear Facilities

2.2 Code of Federal Regulations:³

10 CFR 19 Notices, Instructions and Reports to Workers; Inspections

¹ This guide is under the jurisdiction of Committee E10 on Nuclear Technology and Applications and is the direct responsibility of Subcommittee E10.03 on Radiological Protection for Decontamination and Decommissioning of Nuclear Facilities and Components.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

10 CFR 20 Standards for Protection Against Radiation
 10 CFR 30 Rules of General Applicability to Domestic Licensing of Byproduct Material
 10 CFR 40 Domestic Licensing of Source Material
 10 CFR 50 Domestic Licensing of Production and Utilization Facilities
 10 CFR 51 Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions
 10 CFR 61 Licensing Requirements for Land Disposal of Radioactive Waste
 10 CFR 70 Domestic Licensing of Special Nuclear Material
 10 CFR 71 Packaging and Transportation of Radioactive Materials
 10 CFR 73 Physical Protection of Plants and Materials
 10 CFR 140 Financial Protection Requirements and Indemnity Agreements
 10 CFR 150 Exemption and Continued Regulatory Authority in Agreement States Under Section 274
 10 CFR 170 Fees for Facilities, Materials, Import and Export Licenses and Other Regulatory Services Under the Atomic Energy Act of 1954, as Amended
 10 CFR 830 Nuclear Safety Rules
 10 CFR 835 Occupational Radiation Safety
 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response
 40 CFR 190 Environmental Radiation Protection Standards for Nuclear Power Operations
 40 CFR 191 Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High Level Waste and Transuranic Waste
 40 CFR 192 Health and Environmental Protection for Uranium and Thorium Mill Tailings
 40 CFR 260 Land Disposal Restrictions
 49 CFR 190 and above Hazardous Materials Transportation Regulations

2.3 Nuclear Regulatory Commission Standards:⁴

NRC Regulatory Guide 1.86, Termination of Operating Licenses for Nuclear Reactors
 NUREG-1757 Consolidated Decommissioning Guidance; Volume 1, Decommissioning Process for Material Licenses; Volume 2, Characterization, Survey and Determination of Radiological Criteria; Volume 3, Financial Assurance, Recordkeeping, and Timeliness
 NUREG-1575 Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), Rev 1, August 2000
 NUREG-1575 Supplement 1, Multi-Agency Radiation Survey and Assessment of Materials and Equipment (MAR-SAME)
 NUREG-2082 Monitoring for Compliance with Decommissioning Termination Survey Criteria
 Regulatory Guide 1.179 Standard Format and Content for License Termination Plans for Nuclear Power Reactors (NRC 1999)

2.4 Department of Energy Standard:⁵

DOE Order O 435.1-1 “Radioactive Waste Management” and Supporting Guides and Manuals
 DOE Order 430.1B Real Property Assess Management
 DOE Guide G430.1-3 Deactivation Implementation Guide

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *decommission*, *vt*—to remove a nuclear facility safely from service and reduce residual radioactivity to levels that permit release of the property or facility for unrestricted use and termination of any applicable license(s).

3.1.2 *decontamination*, *n*—those activities employed to reduce the levels of (radioactive) contamination in or on structures, equipment, materials, and personnel.

3.1.3 *dismantlement*, *n*—the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations.

3.1.4 *entombment*, *n*—consists of placing the facility into protective storage. Initial entombment activities consist of removing the balance of plant contaminated components, systems, and structures from the site and sealing all the remaining contaminated and activated plant components and systems within the entombment boundary. This structure provides for containment of the entire radioactive inventory remaining on site during the entombment period. Other initial activities would consist of processing and removing radioactive waste, securing a possession-only license, and implementing security and surveillance plans for the delay period. Decommissioning is completed by either radioactive decay to unrestricted use levels or by dismantlement to unrestricted use levels. If dismantlement were selected following entombment, additional activities would be initiated after 30 or more years and would consist of radiation surveys, removal of the entombment structure and materials within it, processing and removal of any remaining solid and liquid radioactive wastes, and restoring/releasing the site for unrestricted use.

3.1.5 *nuclear facility*, *n*—a facility whose operations involve (or involved) radioactive materials in such form or quantity that a radiological hazard potentially exists to the employees or the general public. Included are facilities that are (or were) used to produce, process, or store radioactive materials. Some examples are nuclear reactors (power, test, or research), fuel fabrication plants, fuel reprocessing plants, uranium/thorium mills, UF-6 production and enrichment plants, radiochemical laboratories, and radioactive waste disposal sites.

3.1.6 *safe storage*, *n*—consists of placing and maintaining the facility in protective storage. Initial safe storage operations would consist of general plant decontamination activities, radiation surveys, the processing and removal of radioactive waste materials, securing a possession-only license, and the implementation of security, surveillance, and maintenance

⁴ Available from Nuclear Regulatory Commission, Public Document Room, 1717 H St., N.W., Washington, DC 20555.

⁵ Available from Dept. of Energy, National Technical Information Service, U.S. Dept. of Commerce, Springfield, VA 22161.