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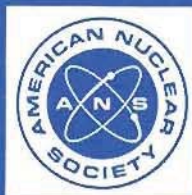
WITHDRAWN

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**volume reduction of low-level
radioactive waste or mixed waste**

an American National Standard

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**American National Standard
for Volume Reduction of Low-Level
Radioactive Waste or Mixed Waste**

Secretariat
American Nuclear Society

Prepared by the
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American National Standard

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Foreword

(This Foreword is not a part of American National Standard for Volume Reduction of Low-Level Radioactive Waste, ANS/ANS-40.35-1991.)

A key aspect for the further development of nuclear waste treatment technology is the effective management of low-level radioactive wastes (LLW) and mixed wastes (MW). Fundamental to the effective management of such radioactive wastes is the design, construction, and operation of waste processing systems. There continues to be substantial interest in the use of waste processing systems that provide significant volume reduction (VR) or destruction of waste streams, or both. Additional interest was generated by recent legal interpretations that require special treatment for the component of any MW containing Resource Conservation and Recovery Act (RCRA) defined waste. In the evaluation of these processing systems, there are several important factors that need to be considered. These include public health and safety, worker safety, economics, liability, RCRA, and the conservation of disposal site resources.

Waste processing systems must meet regulatory requirements for performance, effluent releases, and worker safety. Waste forms produced by these systems also need to meet the disposal site requirements to ensure that the disposal facility performance objectives will be met. Economic considerations involving equipment capital and operating costs, transportation costs, future liability under RCRA, and disposal charges also play an important role in the choice of systems. In addition, conservation of land resources at existing and future disposal facilities may make it necessary to reduce the volumes of wastes accepted for disposal.

It is the purpose of this standard to establish those technical factors that affect the ultimate choice, design, and operation of the VR system. It is the intent of this standard to identify a basis for establishing uniform practices and minimum requirements for the design, construction, and operation of LLW and MW VR systems as applied to nuclear facility operations (power, institutions, laboratories, and disposal sites).

This standard addresses the technical practices and requirements necessary for VR of LLW and MW while maintaining consideration for reducing radiation and chemical exposures to facility operating personnel and releases to the environment.

The committee recommends that the use of additional LLW VR equipment as described in this standard be weighed against the use of tight administrative controls to reduce waste volume generation while maintaining strict compliance with the spirit and letter of RCRA. Administrative procedures should be the first step used to control the quantity of waste generated. The second step is use of VR equipment to properly handle and process wastes prior to disposal.

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Volume Reduction of Low-Level Radioactive Waste or Mixed Waste

1. Scope

This standard sets forth the general design specifications, procurement, and performance requirements for operation of low-level waste (LLW) and mixed waste (MW) volume reduction (VR) processing systems for nuclear power plants and other nuclear facilities. This standard may be applied to the specification of other LLW VR systems (such as government nuclear facilities) if consideration is given to any additional design features required by the hazardous nature of the wastes to be processed by them. For the purpose of this standard, a nuclear facility's LLW VR processing systems begin at the point where treatment of aqueous waste generates a solid waste, or where solid, slurry, or liquid organics wastes are collected, and ends at a waste storage, shipping, or disposal area.

VR techniques may include processes such as drying, incineration, chemical decomposition, flash boiling, mechanical, or high-temperature reduction or destruction techniques, or both. Some VR systems may include, as an integral part of the system, a means for immobilization of the waste. Compaction and solidification techniques are in the scope of American National Standard Solid Radioactive Waste Processing Systems for Light Water Reactor Plants, ANSI/ANS-55.1-1992 [1].¹

2. Definitions

2.1 Limitations. The definitions that follow are of a restrictive nature for the purpose of this standard.

2.2 Glossary of Terms

compactible solids. Solid waste that can be compressed by applying external pressure.

dry combustible solid. Solid waste, including that containing only small amounts of liquids, that can be easily oxidized by chemical or incineration techniques.

dry noncombustible solids. Solid waste that cannot be easily oxidized by chemical or incineration techniques.

dry solids. Solid wastes containing limited amounts of liquid as defined by Title 10, "Energy," Code of Federal Regulations (CFR), Part 61, "Licensing Requirements for Land Disposal of Radioactive Wastes," Section 56, "Waste Characteristics," (b) (2) [2].²

liquid radioactive waste. Liquids containing radioactive materials resulting from the operation of a nuclear facility.

low-level radioactive waste (LLW). Radioactive waste that is not classified as either high-level radioactive waste, transuranic waste, spent nuclear fuel, or by-product material as defined in Section 113 of the Atomic Energy Act of 1954, as amended [3] (uranium or thorium tailings and waste).

mixed waste (MW). LLW that contains Resource Conservation and Recovery Act (RCRA) regulated hazardous wastes as defined in 40 CFR 261 [4] or in applicable U.S. Environmental Protection Agency (EPA) authorized state hazardous waste management regulations.

noncompactible solids. Solid waste that cannot be compressed.

nuclear facility. Any facility that generates waste material containing or potentially containing radioactive materials as a result of its operation. This includes, but is not limited to, nuclear power plants, hospitals, fuel fabricating facilities, and various other industrial and research waste generating facilities.

shall, should, and may. The word "shall" is used to denote a requirement; the word "should" to denote a recommendation; and the word "may"

¹Numbers in brackets refer to corresponding numbers in Section 13, References.

²Hereafter, all references to Code of Federal Regulations documents will appear in abbreviated form. See Section 13, References, for complete citations.