# American Nuclear Society

**WITHDRAWN**
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esign requirements for light water reactor fuel handling systems

an American National Standard

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# American National Standard Design Requirements for Light Water Reactor Fuel Handling Systems

Secretariat
**American Nuclear Society**

Prepared by the
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# Foreword

(This foreword is not a part of American National Standard Design Requirements for Light Water Reactor Fuel Handling Systems, ANSI/ANS-57.1-1980.)

This standard provides minimum design requirements for the designer of fuel handling equipment for water cooled nuclear power plants. It sets forth design requirements which can assist in design and licensing efforts. It does not, however, relieve the designer of the responsibility for compliance with any specific codes referenced herein. The designer is also reminded of Nuclear Regulatory Commission (NRC) regulatory guides which contain information that should be referred to in designing systems and components. The standard was developed under sponsorship of the American Nuclear Society and was first drafted in 1975.

This standard was developed by Working Group ANS-57.1 (formerly ANS-35.31 and 56.6) of the American Nuclear Society which had the participation of the following members during the period it was prepared and approved:

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# Design Requirements for Light Water Reactor Fuel Handling Systems

## 1. Introduction and Scope

**1.1 Introduction** Handling of nuclear fuel presents unique problems. Consideration must be given to cooling, prevention of criticality, protection from physical damage, and radiological protection.

**1.2 Scope** This standard defines the required functions of fuel handling systems at light water reactor nuclear power plants.

It provides minimum design requirements for equipment and tools for safe handling of nuclear fuel and control components at light water reactor nuclear power plants. The fuel handling system covered by this standard consists of handling equipment used for receiving and inspecting fuel containing new and recycled uranium; transporting on-site and loading fuel containing new and recycled uranium or irradiated fuel and control components in the reactor; removing from the reactor, transporting to storage, and inspecting irradiated fuel and loading casks for shipment of irradiated fuel from the site. It includes basic requirements and configuration for design, fabrication, maintenance, and operation. The basis of this standard is that the intended function of the equipment will be performed in an efficient and economical manner that assures protection to plant personnel and to the public, and that any radiation exposurers are maintained as low as reasonably achievable.

## 2. Definitions

**control components.** Items included within the reactor vessel, that control flow or reactivity, and must be handled or shifted in position during, preparing for and recovering from fuel loading or refueling. Examples are: control rods, flow limiting orifices, burnable poison rods.

**control component change mechanism.** Handling equipment usually installed in the refueling canal to move control components from one fuel assembly to another or to a temporary storage location.

**crane.**

(a) **auxiliary fuel handling crane.** A crane used for handling equipment including fuel assemblies and new fuel shipping containers.

(b) **cask crane.** A crane used for handling spent fuel shipping casks, other casks and related equipment.

**failed fuel.** A fuel assembly with a perforation of or a defect in the fuel cladding, or any distortion or break causing a structural change that requires use of abnormal handling procedures or equipment; premature replacement of a fuel assembly; replacement of its component parts or restrictions on plant operation.

**fuel handling machine.** Any equipment operating over the spent fuel pool designed for handling fuel and control components.

**fuel handling system.** Handling equipment used for receiving and inspecting new fuel and fuel containing recycled uranium; transporting on-site and loading fuel containing new and recycled uranium or irradiated fuel and control components in the reactor; removing from the reactor, transporting to storage, and inspecting irradiated fuel and loading casks for shipment of irradiated fuel from the site.

**fuel preparation machine.** A device, consisting of a work platform, frame and movable carriage, used for stripping reusable channels from spent fuel and for rechanneling new fuel in BWRs. It is normally mounted on the wall of the spent fuel pool.

**fuel transfer mechanism.** Handling equipment used to move fuel assemblies between the spent fuel pool and the refueling canal.

**grapple.** The action of attaching or the device making the attachment to a fuel assembly or control component.

**handling tools.** Portable, manually, or power operated devices used for handling or performing operations on fuel assemblies or control components.