

Fusion Systems Rulemaking

NOTE: The NRC is making this preliminary proposed rule language available to the public solely for the purpose of providing information to the public and to provide preparatory material for upcoming public meetings. The release of the preliminary proposed rule language will facilitate discussions at upcoming public meetings. This language does not represent a final NRC staff position, nor has it been reviewed by the Commission. Therefore, the preliminary proposed rule language may undergo significant revision during the rulemaking process. The NRC is not requesting public comments on this preliminary proposed rule language, and no stakeholder requests for a comment period will be granted at this stage in the rulemaking process. Following Commission direction to proceed with the proposed rule, the NRC will seek public comment on the proposed rule in the *Federal Register*.

NOTE: This preliminary proposed rule language may not include all necessary conforming changes

United States Nuclear Regulatory Commission

Preliminary Proposed Rule Language

[NRC-2023-0071]

The NRC is proposing to amend the following sections as indicated by text in **red**:

PART 30—RULES OF GENERAL APPLICABILITY TO DOMESTIC LICENSING OF BYPRODUCT MATERIAL

* * * *

§ 30.4 Definitions.

* * *

Fusion system means a system that, through use of byproduct material or to produce byproduct material, induces nuclear fusion and includes any associated radiation, radioactive material, and supporting structures, systems, and components that are used to contain, process, or control radiation and radioactive materials.

* * *

Particle accelerator means any machine capable of accelerating electrons, protons, deuterons, or other charged particles in a vacuum and of discharging the resultant particulate or other radiation into a medium-~~at energies usually in excess of 1 megaelectron volt~~. For purposes of this definition, accelerator is an equivalent term.

* * * *

§ 30.32 Application for specific licenses.

* * *

(k) An application for a specific license filed under this part for a fusion system must include the following information:

- (1) A general description of the fusion system
- (2) A summary of the radiation safety aspects of the written operating and emergency procedures, including, as applicable,

- (i) A description with diagram(s) of the radiation protection measures to be employed for the fusion system and its radioactive fuel, including all interlocks, access control systems, shielding, and radiation monitors;
- (ii) A description of the radioactive material handling systems procedures and inventory control procedures;
- (iii) A description of any other components or systems used to control radiation and radioactive material;
- (iv) As an alternative to paragraphs (i) through (iii),
 - (A) A description of any aspects of the fusion system relevant to radiation safety that differ from the information listed in paragraphs (i) through (iii), and an explanation for how they ensure the fusion system can be operated safely; and
 - (B) Any other information requested by the NRC staff in preapplication communications to enable the NRC to evaluate whether the fusion system can be operated and eventually decommissioned safely.
- (3) A description of the applicant's organizational structure that describes the radiation safety responsibilities, authorities, and qualifications.
- (4) A description of training related to the fusion system and radiation protection provided to personnel.
- (5) A description of the plan for inspection and maintenance of the fusion system.
- (6) A description of the methodology for radioactive material inventory.

§ 30.33 General requirements for issuance of specific licenses.

(a) An application for a specific license will be approved if:

* * *

(6) In the case of an application for a fusion system, the application demonstrates adequate training and planning to operate and decommission the fusion system safely.

* * * *

§ 30.51 Records.

(a) Each person who produces or receives byproduct material pursuant to a license issued pursuant to the regulations in this part and parts 31 through 36 of this chapter shall keep records showing the production, receipt, transfer, and disposal of the byproduct material as follows:

(1) The licensee shall retain each record of production or receipt of byproduct material as long as the material is possessed and for three years following transfer or disposal of the material.

* * * *

§ 30.52 Inspections.

(a) Each licensee shall afford to the Commission at all reasonable times opportunity to inspect byproduct material and the premises and facilities wherein byproduct material is used, ~~or~~ stored, or produced.

* * * * *

PART 20—STANDARDS FOR PROTECTION AGAINST RADIATION

* * * *

§ 20.1003 Definitions.

* * * *

Fusion system means a system that, through use of byproduct material or to produce byproduct material, induces nuclear fusion and includes any associated radiation, radioactive material, and supporting structures, systems, and components that are used to contain, process, or control radiation and radioactive materials.

* * *

Particle accelerator means any machine capable of accelerating electrons, protons, deuterons, or other charged particles in a vacuum and of discharging the resultant particulate or other radiation into a medium ~~at energies usually in excess of 1 megaelectron volt~~. For purposes of this definition, “accelerator” is an equivalent term.

* * * *

§ 20.2008 Disposal of certain byproduct material.

(a) Licensed material as defined in paragraphs (3) and (4) of the definition of *Byproduct material* set forth in § 20.1003 may be disposed of in accordance with part 61 of this chapter, even though it is not defined as low-level radioactive waste, **subject to paragraph (c) of this part**. Therefore, any licensed byproduct material being disposed of at a facility, or transferred for ultimate disposal at a facility licensed under part 61 of this chapter, must meet the requirements of § 20.2006.

(b) A licensee may dispose of byproduct material, as defined in paragraphs (3) and (4) of the definition of *Byproduct material* set forth in § 20.1003, at a disposal facility authorized to dispose of such material in accordance with any Federal or State solid or hazardous waste law, including the Solid Waste Disposal Act, as authorized under the Energy Policy Act of 2005 **and subject to paragraph (c) of this part**.

(c) Waste resulting from fusion systems must be disposed of in a disposal facility that has completed a site-specific intrusion assessment that demonstrates the projected dose to an individual who inadvertently intrudes into the waste at the facility will be less than 5 millisievert (mSv) per year.

* * * * *

PART 51—ENVIRONMENTAL PROTECTION REGULATIONS FOR DOMESTIC LICENSING AND RELATED REGULATORY FUNCTIONS

* * * *

§ 51.60 Environmental report--materials licenses.

* * *

(b) As required by paragraph (a) of this section, each applicant shall prepare an environmental report for the following types of actions:

(1) Issuance or renewal of a license or other form of permission for:

* * *

(viii) Construction and operation of a fusion system for other than research and development.

* * * * *