7590-01

Nuclear Regulatory Commission

10 CFR Part 110

Export of Reprocessing Plant Components

AGENCY: Nuclear Regulatory Commission.

ACTION: Final rule.

SUMMARY: The Nuclear Regulatory Commission is amending its regulations to further clarify what components are especially designed or prepared for use in a nuclear fuel reprocessing plant and thus are subject to the Commission's export licensing authority. This action will implement the recent decision of the multilateral Non-Proliferation Treaty Exporters Committee (Zangger Committee) to adopt four new definitions to its international export control Trigger List covering specially designed or prepared reprocessing plant components.

EFFECTIVE DATE: May 21, 1985

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SUPPLEMENTARY INFORMATION: During recent years, the U.S. and other nuclear supplier governments have engaged in discussions within the framework of the Non-Proliferation Treaty Exporters Committee (Zangger Committee) to further clarify the coverage of the international nuclear export control "Trigger List". In 1984, agreement was reached to specify coverage of certain additional components of uranium gas centrifuge enrichment plants (see 49 FR 2881, January 24, 1984). Agreement has now been reached on the adoption of new definitions of items specially designed or prepared for use in nuclear fuel reprocessing plants. Currently, all specially designed or prepared reprocessing components are subject in the U.S. to NRC's export licensing control under the provisions of 10 CFR 110.8(c) of NRC's export/import licensing regulations. As a result of the Zangger Committee's action, the Department of State, as the responsible U.S. Government agency for undertaking the Zangger Committee negotiations, has requested that the Commission take appropriate steps to implement the Zangger Committee's decision.

In support of the decision to adopt four new definitions of reprocessing plant components, the Zangger Committee also prepared an introductory note which further clarifies the basis for exercising export controls over the equipment specified. This note reads as follows:

INTRODUCTORY NOTE: SPENT NUCLEAR FUEL REPROCESSING

Reprocessing irradiated nuclear fuel separates plutonium and uranium from intensely radioactive fission products and other transuranic elements. Different technical processes can accomplish this separation. However, over the years Purex has become the most commonly used and accepted process. Purex involves the dissolution of irradiated nuclear fuel in nitric acid, followed by separation of the uranium, plutonium, and fission products by solvent extraction using a mixture of tributyl phosphate in an organic diluent.

Purex facilities have process functions similar to each other, including: irradiated fuel element chopping, fuel dissolution, solvent extraction, and process liquor storage. There may also be equipment for thermal denitration of uranium nitrate, conversion of plutonium nitrate to oxide or metal, and treatment of fission product waste liquor to a form suitable for long term storage or disposal. However, the specific type and configuration of the equipment performing these functions may differ between Purex facilities for several reasons, including the type and quantity of irradiated nuclear fuel to be reprocessed and the intended disposition of the recovered materials, and the safety and maintenance philosophy incorporated into the design of the facility.

The equipment listed below performs key reprocessing functions. Each comes into direct contact with the irradiated fuel or process liquor and operates in an environment characterized by criticality, radiation, and toxicity hazards. These make remote control of the process essential.

(1) Fuel element chopping. This equipment breaches the cladding of the fuel to expose the irradiated nuclear material. Especially designed metal cutting shears are the most commonly employed, although advanced equipment, such as lasers, may be used.

(2) Dissolvers. Dissolvers normally receive the chopped up spent fuel. In these critically safe vessels, the irradiated nuclear material is dissolved in nitric acid and the remaining hulls removed from the process stream.

(3) Solvent extractors. Solvent extractors both receive the solution of irradiated fuel from the dissolvers and the organic solution which separates the uranium, plutonium and fission products. Solvent extraction equipment is normally designed to meet strict operating parameters, such as long operating lifetimes with no maintenance requirements or adaptability to easy replacement, simplicity of operation and control, and flexibility for variations in process conditions.

(4) Holding or storage vessels. Three main process liquor streams result from the solvent extraction step. Holding or storage vessels are used in the further processing of all three streams, as follows:

a) The pure uranium nitrate solution is concentrated by evaporation and passed to a denitration process where it is converted to uranium oxide. This oxide is reused in the nuclear fuel cycle.

b) The intensely radioactive fission products solution is normally concentrated by evaporation and stored as a liquid concentrate. This concentrate may be subsequently evaporated and converted to a form suitable for storage or disposal.

c) The pure plutonium nitrate solution is concentrated and stored pending its transfer to further process steps. In particular, holding or storage vessels for plutonium solutions are designed to avoid criticality problems resulting from changes in concentration and form of this stream.

(5) Plutonium nitrate to oxide conversion system. In most reprocessing facilities, this final process involves the conversion of the plutonium nitrate solution to plutonium dioxide. The main functions involved in this process are: process feed storage and adjustment, precipitation and solid/liquid separation, calcination, product handling, ventilation, waste management, and process control.

(6) Plutonium oxide to metal conversion system. This process, which could be related to a reprocessing facility, involves the fluorination of plutonium dioxide normally with highly corrosive hydrogen flouride, to produce plutonium fluoride which is subsequently reduced using high purity calcium metal to produce metallic plutonium and a calcium fluoride slag. The main functions involved in this process are: fluorination (e.g., involving equipment fabricated or lined with a precious metal), metal reduction (e.g., employing ceramic crucibles), slag recovery, product handling, ventilation, waste management, and process control.

These processes, including the complete systems for plutonium conversion and plutonium metal production, may be identified by the measures taken to avoid criticality (e.g., by geometry), radiation exposure (e.g., by shielding), and toxicity hazards (e.g., by containment).

REGULATORY ACTION REQUIRED

Currently, Part 110 specifies reprocessing plant component export licensing requirements for only (1) fuel element chopping machines; (2) criticality safe tanks; (3) countercurrent solvent extractors; and (4) process control instrumentation. The Zangger Committee's recent action will require the amendment of the solvent extractor entry in §110.8(c)(3) and the addition of three new items: (1) chemical holding or storage vessels; (2) plutonium nitrate to plutonium oxide conversion systems; and (3) plutonium metal production systems.

Because this amendment involves a foreign affairs function of the United States, Commission notice of proposed rulemaking and public procedures thereon are not required by Section 553 of Title 5 of the United States Code. Since the State Department has requested expeditious action on this amendment in order to meet international commitments, the Commission finds that good cause exists for making the amendment effective without the customary 30-day notice.

ENVIRONMENTAL IMPACT: CATEGORICAL EXCLUSION

The NRC has determined that this amendment is a categorical exclusion under 10 CFR 51.22(c)(1). Therefore, neither an environmental impact statement nor an environmental assessment has been prepared for this amendment.

PAPERWORK REDUCTION ACT STATEMENT

This final rule contains no information collection requirements and therefore is not subject to the requirements of the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.).

REGULATORY ANALYSIS

Adoption of this amendment is necessary in order to maintain U.S. consistency with U.S.-supported international nuclear export control guidelines. No other NRC regulatory actions or alternative actions by other agencies address this matter nor are any alternative courses of action feasible. While this amendment impacts all potential U.S. exporters of reprocessing plant components, it is not expected to result in any increased regulatory burden since it essentially clarifies the scope of existing NRC export licensing controls. In addition, to date, NRC has neither received an application to export any reprocessing plant components nor are any such applications expected in the foreseeable future.

LIST OF SUBJECTS IN 10 CFR PART 110

Administrative practice and procedures, classified information, export, import, incorporation by reference, intergovernmental relations, nuclear materials, nuclear power plants and reactors, penalty, reporting and recordkeeping requirements, scientific equipment.

Under the authority of the Atomic Energy Act of 1954, as amended, and 5 U.S.C. 552 and 553, the following amendment to 10 CFR Part 110 is published as a document subject to codification.

PART 110-EXPORT AND IMPORT OF NUCLEAR FACILITIES AND MATERIALS

1. The authority citation for Part 110 is revised to read as follows:

Authority: Sec. 51, 53, 54, 57, 63, 64, 65, 81, 82, 103, 104, 109, 111, 126, 127, 128, 129, 161, 181, 182, 183, 187, 189, 68 Stat. 929, 930, 931, 932, 933, 936, 937, 948, 953, 954, 955, 956, as amended (42 U.S.C. 2071, 2073, 2074, 2077, 2092-2095, 2111, 2112, 2133, 2134, 2139, 2139a, 2141, 2154-2158, 2201, 2231-2233, 2237, 2239); sec. 201, 88 Stat. 1242, as amended (42 U.S.C. 5841).

Section 110(b)(2) also issued under Pub. L. 96-533, 94 Stat. 3138 (22 U.S.C. 2403). Section 110.11 also issued under sec. 122, 68 Stat. 939 (42 U.S.C. 2152) and secs. 54c. and 57d., 88 Stat. 473, 475 (42 U.S.C. 2074). Section 110.50(b)(3) also issued under sec. 123, 92 Stat. 142 (42 U.S.C. 2153). Section 110.51 also issued under sec. 184, 68 Stat. 954, as amended (42 U.S.C. 2234). Section 110.52 also issued under sec. 186, 68 Stat. 955 (42 U.S.C. 2236). Sections 110.80-110.113 also issued under 5 U.S.C. 552, 554. Sections 110.130-110.135 also issued under 5 U.S.C. 553.

For the purpose of sec. 223, 68 Stat. 958, as amended (42 U.S.C. 2273); §§110.20-110.29, 110.50, and 110.120-110.129 also issued under secs. 161b. and i., 68 Stat. 948, 949, as amended (42 U.S.C. 2201(b) and (i); and §110.53 also issued under sec. 161o., 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

2. In §110.8, paragraph (c) is revised to read as follows:

§110.8 List of nuclear equipment and material under NRC export licensing authority.

* * * * *

(c) Plants for the reprocessing of irradiated nuclear reactor fuel elements and components for those plants as follows:

(1) Fuel element chopping machines, i.e., remotely operated equipment specially designed or prepared to cut, chop, or shear irradiated nuclear reactor fuel assemblies, bundles, or rods.

(2) Criticality safe tanks, i.e., small diameter, annular or slab tanks specially designed or prepared for the dissolution of irradiated nuclear reactor fuel.

(3) Solvent extraction equipment. Especially designed or prepared solvent extractors such as packed or pulse columns, mixer settlers or centrifugal contactors for use in a plant for the reprocessing of irradiated fuel. Because solvent extractors must be resistant to the corrosive effect of nitric acid, they are normally fabricated to extremely high standards (including special welding and inspection and quality assurance and quality control techniques) out of low carbon stainless steels, titanium, zirconium or other high quality materials.

(4) Chemical holding or storage vessels. Especially designed or prepared holding or storage vessels for use in a plant for the reprocessing of irradiated fuel. Because holding or storage vessels must be resistant to the corrosive effect of nitric acid, they are normally fabricated of materials such as low carbon stainless steels, titanium or zirconium, or other high quality materials. Holding or storage vessels may be designed for remote operation and maintenance and may have the following features for control of nuclear criticality:

(i) Walls or internal structures with a boron equivalent of at least 2 percent, or

(ii) A maximum diameter of 7 inches (17.78 cm) for cylindrical vessels, or

(iii) A maximum width of 3 inches (7.62 cm) for either a slab or annular vessel.

(5) Plutonium nitrate to plutonium oxide conversion systems. Complete systems especially designed or prepared for the conversion of plutonium nitrate to plutonium oxide, in particular, adapted so as to avoid criticality and radiation effects and to minimize toxicity hazards.

(6) Plutonium metal production systems. Complete systems especially designed or prepared for the production of plutonium metal, in particular adapted so as to avoid criticality and radiation effects and to minimize toxicity hazards.

(7) Process control instrumentation specially designed or prepared for monitoring or controlling the processing of material in a reprocessing plant.

(8) Any other components specially designed or prepared for use in a reprocessing plant or in any of the components described in this paragraph.

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Dated at Washington, DC this 14th day of March 1985.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,

Secretary of the Commission.