


NOTIFICATION ON SCHEDULE OF PRESCRIBED SUBSTANCES UNDER  
ATOMIC ENERGY ACT 1962

20 January 2006

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परमाणु ऊर्जा विभाग  
अधिसूचना  
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का.आ. 61(अ).— परमाणु ऊर्जा अधिनियम 1962 (1962 का संख्या 33) की धारा 2 की उपधारा (1) के खंड (एफ) और (जी) तथा धारा 3 के अनुसरण में और भारत सरकार के परमाणु ऊर्जा विभाग के दिनांक 15 मार्च 1995 की अधिसूचना संख्या एस. ओ. 211 (ई) तथा दिनांक 15 मार्च 1995 की अधिसूचना संख्या एस. ओ. 212 (ई) के अधिक्रमण में केंद्र सरकार इसके साथ में संलग्न अनुसूची में विहित पदार्थों, उपकरण और प्रौद्योगिकी को एतद्वारा, विहित पदार्थों, विहित उपकरणों एवं प्रौद्योगिकी के रूप में अधिसूचित करती है।

[फा. सं. एईए/27(1)/2005-ईआर]  
व्ही. पी. राजा, अपर सचिव

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**THE SCHEDULE**

**Category – 0 : Nuclear materials, nuclear-related other materials, equipment and technology.**

**0A**

**Prescribed Substances**

*Note:* Any radioactive material in Category 0A shall additionally attract the provisions of the Atomic Energy (Radiation Protection) Rules, 2004 made under the Atomic Energy Act, 1962 and the provisions of Section-16 of the Atomic Energy Act, 1962.

**0A1 Source Material**

- 0A101** Uranium containing the mixture of isotopes occurring in nature.
- 0A102** Uranium depleted in the isotope 235.
- 0A103** Thorium.
- 0A104** Any of the foregoing in the form of metal, alloy, chemical compound, or concentrate or any substance.
- 0A105** Any other material containing one or more of the foregoing.

*Prescribed quantitative limits: as given below and in any period of 12 months:*

- a. Uranium (containing the mixture of isotopes in nature) exceeding 100 kilograms.
- b. Depleted uranium (uranium depleted in the isotope 235 below that occurring in nature) exceeding 1000 kilograms.
- c. Thorium exceeding 1000 kilograms.

**0A2 Special Fissionable Material**

- 0A201** Plutonium-239.
- 0A202** Uranium-233.
- 0A203** Uranium enriched in the isotopes 235 or 233.
- 0A204** Neptunium.
- 0A205** Any material containing one or more of the foregoing.
- 0A206** Such other fissionable material determined by the Central Government from time to time, but the term “special fissionable material” does not include source material.

*Note: Any quantity of special fissionable material is prescribed substance.*

**0A3 Other Materials**

‘Other Materials’ means non-nuclear materials for reactors, nuclear related dual-use materials indicated below and such materials as determined by the Central Government from time to time.

- 0A301** Deuterium, heavy water (deuterium oxide) and any other deuterium

compound, in which the ratio of deuterium to hydrogen atoms exceeds 1:5000, in quantities exceeding 5 kilograms of deuterium in one consignment or 25 kilograms of deuterium in any period of 12 months.

**0A302** Nuclear grade graphite / carbon, having a purity level better than 5 parts per million (ppm) boron equivalent and with a density greater than 1.5 gram/cc in quantities exceeding 30 metric tons in any period of 12 months.

**0A303** Zirconium with hafnium content of less than 1 part to 500 parts of zirconium by weight (i.e. less than 2000 ppm) in the form of metal, its alloys, compounds, manufactures thereof, waste or scrap of any of the foregoing.

**0A304** Beryllium, its compounds, alloys and its minerals / concentrates including Beryl but excluding:  
a. beryllium windows used for x-ray machines and gamma ray detectors and  
b. beryl in the form of emeralds or aquamarines.

**0A305** Lithium enriched in the Lithium-6 ( $^6\text{Li}$ ) isotope to greater than its natural isotopic abundance (i.e. more than 7.5%) and the products or devices containing enriched lithium such as elemental lithium, alloys, compounds, mixtures containing lithium, manufactures thereof, waste or scrap of any of the foregoing.

**0A306** Niobium and Tantalum, their metals, alloys and minerals including columbite and tantalite.

**0A307** Titanium alloys having both of the following characteristics:  
a. 'Capable of' an ultimate tensile strength of 900 MPa or more at 293 K (20<sup>0</sup>C); and  
b. In the form of tubes or cylindrical solid forms (including forgings) with an outside diameter of more than 75 mm.

*Technical note:* The phrase 'capable of' encompasses titanium alloys before or after heat treatment.

**0A308** Tritium, tritium compounds or mixtures containing tritium in which the ratio of tritium to hydrogen atoms exceeds 1 part in 1000, except when utilized in such quantities and for such purposes as for organic labelled compounds, Gas Filled Light Sources and as Tritiated Water for radiotracer studies.

**0A309** Hafnium:  
Hafnium metal, alloys containing more than 60% hafnium by weight, hafnium compounds containing more than 60% hafnium by weight, manufactures thereof, and waste or scrap of any of the foregoing.

**0A310** Radium-226:  
Radium-226 (<sup>226</sup>Ra), radium-226 alloys, radium-226 compounds, mixtures containing radium-226, manufactures thereof, and products or devices containing any of the foregoing, except medical applicators and a product or device containing less than 0.37 GBq (10mCi) of Ra-226 in any form.

**0A311** Boron  
Boron enriched in the Boron-10 (<sup>10</sup>B) isotope to greater than its natural isotopic abundance as follows:  
Elemental boron, compounds, mixtures containing boron, manufactures thereof, waste or scrap of any of the foregoing.

**0A312** Helium-3  
Helium-3 (<sup>3</sup>He), mixtures containing helium-3, and products or devices containing any of the foregoing.

*Note: A product or device containing less than 1gm of Helium-3 is excluded.*

**0A313** Alpha-emitting radionuclides:  
  
Alpha-emitting radionuclides having an alpha half-life of 10 days or greater but less than 200 years, in the following forms:

- Elemental;
- Compounds having a total alpha activity of 37 GBq per kg or greater;
- Mixtures having a total alpha activity of 37 GBq per kg or greater;
- Products or devices containing any of the foregoing.

Alpha emitters controlled by this item include:

Actinium-225	Actinium-227	Americium-242m
Californium-248	Californium-250	Californium-252
Californium-253	Californium-254	Curium-240
Curium-241	Curium-242	Curium-243
Curium244	Einsteinium-252	Einsteinium-253
Einsteinium254	Einsteinium-255	Fermium-257
Gadolinium-148	Mendelevium-258	Neptunium-235
Plutonium-236	Plutonium-237	Plutonium-238
Plutonium-241	Polonium-209	Polonium-210
Polonium-208	Radium-223	Thorium-228
Thorium-227	Uranium-230	Uranium-232

**0A314** \*Titanium ores and concentrates (Ilmenite, Rutile and Leucoxene)

**0A315** \*Zirconium, its alloys and compounds and minerals/concentrates including zircon

*\*Note: These items (0A314 and 0A315) shall remain prescribed substances only till such time the Policy on Exploitation of Beach Sand Minerals notified vide Resolution number 8/1(1)/97-PSU/1422 dated the 6<sup>th</sup> October, 1998 is adopted/revised/modified by the Ministry of Mines or till the 1<sup>st</sup> January 2007, whichever occurs earlier and shall cease to be so thereafter.*

**0B Prescribed Equipment**

**0B001** Nuclear Reactors; associated equipment, components, and systems specially designed, prepared, or adapted or used or intended to be used in such reactors as follows:

- a. Complete nuclear reactors
- b. Nuclear reactor vessels
- c. Nuclear reactor fuel charging and discharging machines
- d. Nuclear reactor control rods and equipment
- e. Nuclear reactor pressure tubes
- f. Zirconium tubes and assemblies of tubes in which hafnium to zirconium ratio is 1:500 or less
- g. Primary coolant pumps
- h. Nuclear reactor internals
- i. Heat exchangers (steam generators) for use in the primary coolant circuit of a nuclear reactor
- j. Neutron detection and measuring instruments for determining neutron flux levels within the core of a nuclear reactor

**0B002** Plants for processing, production, concentration, conversion or recovery of Prescribed Substances (such as uranium, plutonium, thorium, deuterium, heavy water, tritium, lithium); associated equipment, components and systems specially designed, prepared or adapted or used or intended to be used in such plants including but not limited to:

- a. Plants for production or concentration of deuterium, heavy water-
  - 1. Water - Hydrogen Sulphide Exchange Towers
  - 2. Blowers and Compressors for hydrogen-sulphide gas circulation
  - 3. Ammonia-Hydrogen Exchange Towers greater than or equal to 35 m in height with diameters of 1.5 m to 2.5 m
  - 4. Tower Internals and Stage Pumps
  - 5. Ammonia Crackers with operating pressures greater than or equal to 3 MPa
  - 6. Infrared Absorption Analyzers capable of 'on-line' hydrogen/deuterium ratio analysis
  - 7. Catalytic Burners for conversion of enriched deuterium gas into heavy water

8. Complete heavy water upgrade systems or columns therefore

- b. Plants for the conversion of uranium
- c. Plants for the conversion of plutonium
- d. Tritium facilities or plants, and equipment therefor
- e. Lithium isotope separation facilities or plants, and equipment therefor

**0B003**

Plants for reprocessing of irradiated nuclear fuel and equipment, components and systems specially designed, prepared or adapted or used or intended to be used in such plants, including but not limited to:

- a. Irradiated fuel element chopping machines designed for remote operation
- b. Dissolvers capable of withstanding hot and highly corrosive liquid for dissolution of irradiated nuclear fuel and which can be remotely loaded and maintained
- c. Solvent extractors and solvent extraction equipment resistant to the corrosive effect of nitric acid
- d. Chemical holding or storage vessels resistant to the corrosive effect of nitric acid
- e. Industrial equipment including assemblies and components as follows:
  - 1. High density (lead glass or other) radiation shielding windows
  - 2. Radiation hardened TV cameras, or lenses therefor
  - 3. 'Robots' or 'end effectors' specially designed for handling high explosives; and control units therefor
  - 4. Remote manipulators that can be used to provide remote actions in radiochemical separation operations or hot cells

**0B004**

Plants for treatment, handling, storage and transportation of radioactive wastes from nuclear reactors or from plants for processing Source Materials or Special Fissionable Materials or from nuclear reprocessing plants; irradiated nuclear fuel; Special Fissionable Materials, and equipment specially designed, prepared, adapted, or intended to be used therefor.

**0B005**

All systems, associated equipment, components for separation or enrichment of isotopes of uranium, plutonium, lithium or boron, other than analytical instruments, specially designed, prepared, adapted, used or intended to be used therefor as follows:

- a. Gas centrifuges and assemblies and components specially designed or prepared for use in gas Centrifuges
- b. Specially designed or prepared auxiliary systems, equipment and components for gas centrifuge enrichment plants
- c. Specially designed or prepared assemblies and components for use in gaseous diffusion enrichment
- d. Specially designed or prepared auxiliary systems, equipment and

- components for use in gaseous diffusion enrichment
- e. Specially designed or prepared systems, equipment and components for use in aerodynamic enrichment plants
  - f. Specially designed or prepared systems, equipment and components for use in chemical exchange or ion exchange enrichment plants.
  - g. Specially designed or prepared systems, equipment and components for use in laser-based enrichment plants.
  - h. Specially designed or prepared systems, equipment and components for use in plasma separation enrichment plants.
  - i. Specially designed or prepared systems, equipment and components for use in electromagnetic enrichment plants.

- 0B006** Plants for the fabrication of nuclear reactor fuel elements, and equipment specially designed or prepared therefor including but not limited to:
- a. fully automatic pellet inspection stations specially designed or prepared for checking final dimensions and surface defects of the fuel pellets;
  - b. automatic welding machines specially designed or prepared for welding end caps onto the fuel pins (or rods);
  - c. automatic test and inspection stations specially designed or prepared for checking the integrity of completed fuel pins (or rods).

Item 'c' typically includes equipment for: 1) x-ray examination of pin (or rod) end cap welds, 2) helium leak detection from pressurized pins (or rods), and 3) gamma-ray scanning of the pins (or rods) to check for correct loading of the fuel pellets inside.

- 0B007** Plants or systems for production, handling, storage and transportation of Radioisotopes in quantities exceeding 100 Curies ( $3.7 \times 10^{12}$  Becquerel).

- 0B008** Neutron generators including neutron chain reacting assemblies and fusion assemblies of all kinds for producing fissile materials

**0C** **Technology**

Technology and software for the development, production or use of prescribed substances or prescribed equipment specified in 0A or 0B.

*Note : The numbering system followed in this Schedule is in harmony with the numbering system followed in the Special Chemicals, Organisms, Materials, Equipment and Technology (SCOMET) List in Appendix – 3 of Schedule 2 of ITC (HS) Classification*