3012. Tritium, compounds and mixtures containing tritium in which the ratio of tritium to hydrogen by atoms exceeds 1 part in 1,000, and products containing one or more of the foregoing, except:

a. Shipments of tritium, compounds, mixtures and individual products containing one or more of the foregoing substances not exceeding 100 curies;
b. Tritium contained in luminous paint, self-luminous products, gas and aerosol detectors, electron tubes, lightning or static elimination devices, ion generating tubes, detector cells of gas chromatography devices, and calibration standards;
c. Compounds and mixtures of tritium, where the separation of the constituents cannot result in the evolution of an isotopic mixture of hydrogen in which the ratio of tritium to hydrogen by atoms exceeds 1 part in 1,000.

3013. Materials for nuclear heat sources, as follows:

a. Plutonium in any form with a plutonium isotopic assay of plutonium-238 of more than 50 weight percent (o/w), except:
   1. Shipments with a plutonium content of one gramme or less;
   2. Shipments of three "effective grammes" or less when contained in a sensing component in instruments;
b. "Previously separated" neptunium-237 in any form, except shipments with a neptunium-237 content of one gramme or less.

3015. Wet-proofed platinized catalysts specially designed or prepared for promoting hydrogen isotope exchange between hydrogen and water for the recovery of tritium from heavy water or for heavy water production.

B. Nuclear Facilities

3101. Plants for the separation of isotopes of natural and depleted uranium, "special fissile materials" and other fissile materials, and specially designed or prepared equipment and components therefor, as follows:

a. Plants specially designed for separating isotopes of natural and depleted uranium, "special fissile materials" and other fissile materials, as follows:
   1. Gaseous diffusion separation plants;
   2. Gas centrifuge separation plants;
   3. Aerodynamic separation plants;
   4. Chemical exchange separation plants;
   5. Ion-exchange separation plants;
   6. Atomic vapour "laser" isotopic separation plants;
   7. Molecular "laser" isotopic separation plants;
   8. Plasma separation plants;
   9. Electromagnetic separation plants;
b. Equipment and components, as follows, specially designed or prepared for:
   1. Gaseous diffusion separation process:
      a. Valves wholly made of or lined with aluminium, aluminium alloys, nickel or alloy containing 60 weight percent (o/w) or more nickel, 40 mm or more in diameter, with bellows seals;
      b. Blowers and compressors (turbo, centrifugal and axial flow types) wholly made of or lined with aluminium, aluminium alloys, nickel or alloy containing 60 weight percent (o/w) or more nickel and having a capacity of 1,700 litres (1.7 m^3) per minute or more, including compressor seals;
      c. Gaseous diffusion barriers made of porous metallic, polymer or ceramic materials resistant to corrosion by uranium hexafluoride (UF_6) with a pore size of less than 1,000 angstroms, a thickness of 5 mm or less, and, for tubular forms, a diameter of 25 mm or less;
      d. Gaseous diffuser housings;
      e. Heat exchangers made of aluminium, copper, nickel or alloy containing more than 60 weight percent (o/w) nickel, or combinations of these metals as clad tubes, designed to operate at sub-atmospheric pressure with a leak rate that limits the pressure rise to less than 10 pascal (0.1 millibar) per hour under a pressure differential of 10^5 pascal (1 bar);
   2. Gas centrifuge separation process:
      a. Gas centrifuges;
      b. Complete rotor assemblies;
      c. Rotor tube cylinders with a thickness of 12 mm or less, a diameter of between 75 mm and 400 mm made from high strength-to-density ratio materials described in the Technical Note 3101.b.2;
      d. Magnetic suspension bearings consisting of an annular magnet suspended within a housing containing a damping medium (the magnet couples with a pole piece or second magnet fitted to the top cap of the rotor);
      e. Specially prepared bearings comprising a pivot-cup assembly mounted on a damper;
      f. Rings or bellows with a wall thickness of 3 mm or less and a diameter of between 75 mm and 400 mm and designed to give local support to a rotor tube or to join a number together, made from high strength-to-density ratio materials described in the Technical Note 3101.b.2;
      g. Baffles with a diameter of between 75 mm and 400 mm for mounting inside the rotor tube, made from high strength- to-density ratio materials described in the Technical Note 3101.b.2;
      h. Top and bottom caps with a diameter of between 75 mm and 400 mm to fit the ends of the rotor tube, made from high strength-to-density ratio materials described in the Technical Note 3101.b.2;
      i. Molecular pumps comprised of cylinders having internally machined or extruded helical grooves and internally machined bores;
      j. Ring-shaped motor stators for multiphase AC hysteresis (or reluctance) motors for synchronous operation within a vacuum in the frequency range of 600 to 2,000 Hz and a power range of 50 to 1,000 Volt-Amps;
      k. Frequency changers (converters or inverters) specially designed or prepared to supply motor stators for gas centrifuge enrichment, having all of the following characteristics, and specially designed components therefor:
         1. Multiphase output of 600 Hz to 2 kHz;
         2. Frequency control better than 0.1%;
         3. Harmonic distortion of less than 2%; **and**
         4. An efficiency of more than 80%;

      Technical Note:

      The high strength-to-density ratio materials used for centrifuge rotating components are:

      a. Maraging steel capable of an ultimate tensile strength of 2.05×10^9 N/m^2 or more;

      *b. Aluminium alloys capable of an ultimate tensile strength of 0.46 x 109 N/m^2 or more; **or***

      c. "Fibrous and filamentary materials" with a specific modulus of more than 3.18×10^6 m and a specific tensile strength exceeding 7.62×10^4 m.

      N.B.:

      1. Specific modulus: Young's modulus in pascals, equivalent to N/m^2 divided by specific weight in N/m^3, measured at a temperature of (296 ± 2) K ((23 ± 2)°C) and a relative humidity of (50 ± 5)%.

      2. Specific tensile strength: ultimate tensile strength in pascals, equivalent to N/m^2 divided by specific weight in N/m^3, measured at a temperature of (296 ± 2) K ((23 ± 2)°C) and a relative humidity of (50 ± 5)%.
   3. Aerodynamic separation process:
      a. Separation nozzles consisting of slit-shaped, curved channels having a radius of curvature less than 1 mm (contained within the nozzle is a knife-edge which separates gas flowing through the nozzle into two streams);
      b. Tangential inlet flow-driven cylindrical or conical tubes, specially designed for uranium isotope separation;
      c. UF_6-hydrogen helium compressors wholly made of or lined with aluminium, aluminium alloys, nickel or alloy containing 60 weight percent (o/w) or more nickel, including compressor seals;
      d. Aerodynamic separation element housings, designed to contain vortex tubes or separation nozzles;