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GOEWERMENTSKENNISGEWINGS

DEPARTEMENT VAN MINERAAL- EN ENERGIESAKE

No. 739

16 April 1994

VERLENGING VAN TYDPERK GEDEK DEUR VERKLARING IN NASIONALE BELANG

Ek, George Shepstone Bartlett, Minister van Mineraal- en Energiesake, verklaar hierby kragtens artikel 9 (1) (f) van die Wet op Myne en Bedrywe, 1956 (Wet No. 27 van 1956), dat werk wat op Sondae te Harmony Gold Mining Company Limited verrig word en wat in nasionale belang verklaar is by Goewermentskennisgewing No. 2825 in *Staatskoerant* No. 14322 van 9 Oktober 1992, na my mening steeds in nasionale belang nodig is en dat dit vanaf **17 April 1994** vir 'n tydperk van een jaar voortgesit mag word.

G. S. BARTLETT,

Minister van Mineraal- en Energiesake.

No. 740

16 April 1994

WET OP KERNENERGIE, 1993 (WET No. 131 VAN 1993)

VERKLARING VAN SEKERE STOWWE, MATERIALE EN TOERUSTING TOT BEPERKTE MATERIAAL, BRONMATERIAAL, SPESIALE KERNMATERIAAL EN KERNVERWANTE TOERUSTING EN MATERIAAL

Ek, George Shepstone Bartlett, Minister van Mineraal- en Energiesake, verklaar hierby kragtens—

- (1) paragraaf (a) van artikel 2 van die Wet op Kernenergie, 1993 (Wet No. 131 van 1993), die stowwe gespesifiseer in Bylae 1, tot beperkte materiaal vir die doeleindes van die genoemde Wet;

GOVERNMENT NOTICES

DEPARTMENT OF MINERAL AND ENERGY AFFAIRS

No. 739

16 April 1994

EXTENSION TO TERM COVERED BY DECLARATION IN THE NATIONAL INTEREST

Under section 9 (1) (f) of the Mines and Works Act, 1956 (Act No. 27 of 1956), I, George Shepstone Bartlett, Minister of Mineral and Energy Affairs, hereby declare that work performed on Sundays at Harmony Gold Mining Company Limited, which was declared in the national interest by Government Notice No. 2825 in *Government Gazette* No. 14322 of 9 October 1992 is, in my opinion, still necessary in the national interest and that it may be continued from **17 April 1994**, for a period of one year.

G. S. BARTLETT,

Minister of Mineral and Energy Affairs.

No. 740

16 April 1994

NUCLEAR ENERGY ACT, 1993 (ACT No. 131 OF 1993)

DECLARATION OF CERTAIN SUBSTANCES, MATERIALS AND EQUIPMENT AS RESTRICTED MATERIAL, SOURCE MATERIAL, SPECIAL NUCLEAR MATERIAL AND NUCLEAR RELATED EQUIPMENT AND MATERIAL

I, George Shepstone Bartlett, Minister of Mineral and Energy Affairs, hereby declared under—

- (1) paragraph (a) of section 2 of the Nuclear Energy Act, 1993 (Act No. 131 of 1993), the substances specified in Schedule 1, to be restricted material for the purposes of the said Act;

- (2) paragraaf (b) van artikel 2 van die genoemde Wet, die stowwe gespesifiseer in Bylae 2, tot bronmateriaal vir die doeleindes van die genoemde Wet;
- (3) paragraaf (c) van artikel 2 van die genoemde Wet, die materiale gespesifiseer in Bylae 3, tot spesiale kernmateriaal vir die doeleindes van die genoemde Wet; en
- (4) paragraaf (h) van artikel 2 van die genoemde Wet, die toerusting en die materiaal gespesifiseer in Bylae 4, tot kernverwante toerusting en materiaal vir die doeleindes van die genoemde Wet.

Aansoeke om magtigings ingevolge artikels 21 en 22 van die genoemde Wet, moet gerig word aan—

Die Hoof- Uitvoerende Beampte
Atoomenergiekorporasie van Suid-Afrika Beperk
Posbus 582
PRETORIA
0001.

Goewermentskennisgewing No. 1023 van 8 Mei 1987 word hierby herroep.

G. S. BARTLETT,

Minister van Mineraal-en Energiesake.

BYLAE 1: BEPERKTE MATERIAAL

1. Berillium

Berillium soos volg: Metaal, legerings wat meer as 50% berillium per massa bevat, verbindings wat berillium bevat, en vervaardigings daarvan *behalwe*—

- (a) metaalvensters vir X-straalmasjiene;
- (b) oksiedfatsoene in vervaardigde of halfvervaardigde vorms spesiaal ontwerp vir elektroniese komponentonderdele of as substrats vir elektroniese kringe.

Tegniese nota: Hierdie beheer is van toepassing op afval en skroot wat berillium bevat soos hier gedefinieer.

2. Hafnium

Hafnium van die volgende beskrywing: Metaal, legerings en verbindings van hafnium wat meer as 60% hafnium per massa bevat en vervaardigings daarvan.

3. Sirkonium

Sirkonium soos volg: Metaal, legerings wat meer as 50% sirkonium per massa bevat, en verbindings waarin die verhouding van hafniuminhoud tot sirkoniuminhoud minder is as 1 deel tot 500 dele per massa, en vervaardigings wat volledig daarvan gemaak is, *behalwe sirkonium in die vorm van foelie met 'n dikte wat nie 0,10 mm oorskry nie*.

Tegniese nota: Hierdie beheer is van toepassing op afval en skroot wat sirkonium bevat soos hier gedefinieer.

- (2) paragraph (b) of section 2 of the said Act, the substances specified in Schedule 2, to be source material for the purposes of the said Act;
- (3) paragraph (c) of section 2 of the said Act, the materials specified in Schedule 3, to be special nuclear material for the purpose of the said Act; and
- (4) paragraph (h) of section 2 of the said Act, the equipment and material specified in Schedule 4, to be nuclear related equipment and material for the purposes of the said Act.

Applications for authorities in terms of sections 21 and 22 of the said Act, must be directed to—

The Chief Executive Officer
Atomic Energy Corporation of South Africa Limited
P.O. Box 582
PRETORIA
0001.

Government Notice No. 1023 of 8 May 1987 is hereby repealed.

G. S. BARTLETT,

Minister of Mineral and Energy Affairs.

SCHEDULE 1: RESTRICTED MATERIAL

1. Beryllium

Beryllium as follows: Metal, alloys containing more than 50% of beryllium by mass, compounds containing beryllium, and manufactures thereof, *except*—

- (a) metal windows for X-ray machines;
- (b) oxide shapes in fabricated or semi-fabricated forms specially designed for electronic component parts or as substrates for electronic circuits.

Technical Note: This control applies to waste and scrap containing beryllium as defined here.

2. Hafnium

Hafnium of the following description: Metal, alloys and compounds of hafnium containing more than 60% hafnium by mass and manufactures thereof.

3. Zirkonium

Zirkonium as follows: Metal, alloys containing more than 50% zirkonium by mass and compounds in which the ratio of hafnium content to zirkonium content is less than 1 part to 500 parts by mass, and manufactures wholly thereof: *except zirkonium in the form of foil having a thickness not exceeding 0,10 mm*.

Technical Note: This control applies to waste and scrap containing zirkonium as defined here.

BYLAE 2: BRONMATERIAAL**Bronmateriaal**

Bronmateriaal is enige stof wat die volgende bevat:

- (a) Uraan, uitgedruk as 'n omsetting na uraanoksied U_3O_8 , bo—
 - (i) 0,05% van die massa van die stof; en
 - (ii) 'n massa van 3 kilogram; of
- (b) torium, uitgedruk as 'n omsetting na toriumoksied ThO_2 , bo—
 - (i) 0,05% van die massa van die stof; en
 - (ii) 'n massa van 3 kilogram; of
- (c) uraan, verarm in die 235 isotoop, bo 3 kilogram.

BYLAE 3: SPESIALE KERNMATERIAAL**Spesiale kernmateriaal**

Spesiale kernmateriaal is—

- (a) uraan-233;
- (b) uraan verryk in sy uraan-235 isotoop;
- (c) transuraanelemente; of
- (d) 'n samestelling van enige van die materiale in subparagrafe (a), (b) en (c) bedoel, of van enigiets aldus bedoel en enige ander stof of stowwe, in 'n hoeveelheid bestaande uit of bevattende 'n massa van enige van die isotope of elemente waarna in subparagrafe (a), (b) en (c) verwys word,

bo 0,5 gram, ongeag die sterkte daarvan.

BYLAE 4: KERNVERWANTE MATERIAAL EN TOERUSTING**KATEGORIE A: MATERIAAL****1. Deuterium en swaarwater**

Deuterium, swaarwater (deuteriumoksied) en enige ander deuteriumverbinding waarin die verhouding van deuterium- tot waterstofatome 1:5 000 oorskry vir gebruik in 'n kernreaktor.

2. Kerngraadgrafiet

Grafiet met 'n suiwerheidspeil beter as 5 dele per miljoen boor-ekwivalent en met 'n digtheid hoër as $1,50 \text{ g/cm}^3$.

KATEGORIE B: TOERUSTING**1. Reaktors en toerusting daarvoor**

- (1) Volledige kernreaktors wat bedryf kan word sodat 'n beheerde selfonderhoudende klowingskettingreaksie gehandhaaf word.
- (2) Metaal reaktordrukuate as volledige eenhede of as hoof werkwinkelvervaardigde onderdele, wat spesiaal ontwerp of voorberei is om die hart van 'n kernreaktor, soos bedoel in subparagraaf (1), te bevat en in staat is om die bedryfsdruk van die primêre koelmiddel te weerstaan.

SCHEDULE 2: SOURCE MATERIAL**Source material**

Source material is any substance containing—

- (a) uranium, expressed as a conversion to uranium oxide U_3O_8 , above—
 - (i) 0,05% of the mass of the substance; and
 - (ii) a mass of 3 kilograms; or
- (b) thorium, expressed as a conversion to thorium oxide ThO_2 , above—
 - (i) 0,05% of the mass of the substance; and
 - (ii) a mass of 3 kilograms; or
- (c) uranium, depleted in the isotope 235, above 3 kilograms.

SCHEDULE 3: SPECIAL NUCLEAR MATERIAL**Special nuclear material is—**

- (a) uranium-233;
- (b) uranium enriched in its uranium-235 isotope;
- (c) transuranium elements; or
- (d) any compound of any of the materials referred to in subparagraphs (a), (b) and (c) or of anything so referred to and any other substance or substances in a quantity consisting of or containing a mass of any of the isotopes or elements referred to in subparagraphs (a), (b) and (c),

above 0,5 gram, regardless of the concentration thereof.

SCHEDULE 4: NUCLEAR RELATED MATERIAL AND EQUIPMENT**CATEGORY A: MATERIAL****1. Deuterium and heavy water**

Deuterium, heavy water (deuterium oxide) and any other deuterium compound in which the ratio of deuterium to hydrogen atoms exceeds 1:5 000 for use in a nuclear reactor.

2. Nuclear grade graphite

Graphite having a purity level better than 5 parts per million boron equivalent and with a density greater than $1,50 \text{ g/cm}^3$.

CATEGORY B: EQUIPMENT**1. Reactors and equipment therefor**

- (1) Complete nuclear reactor capable of operation so as to maintain a controlled self-sustaining fission chain reaction.
- (2) Reactor pressure vessels as complete units or as major shop-fabricated parts which are especially designed or prepared to contain the core of a nuclear reactor referred to in subparagraph (1), and are capable of withstanding the operating pressure of the primary coolant.

- (3) Reaktorbrandstoflaai- en ontlaaimasjiene spesiaal ontwerp of voorberei vir inplasing of verwydering van brandstof in 'n kernreaktor, soos bedoel in subparagraaf (1), wat in staat is tot herlading tydens bedryf of met tegnies gesofistikeerde posisionering of inlynstellingseienskappe vir gebruik om komplekse herlading buite bedryf uit te voer, soos dié waarin direkte sig van of toegang tot die brandstof nie gewoonlik sigbaar is nie.
- (4) Reaktorbeheerstawe spesiaal ontwerp of voorberei vir die beheer van die reaksietempo in 'n kernreaktor soos in subparagraaf (1) bedoel.
- (5) Reaktordrukbuise wat spesiaal ontwerp of voorberei is om brandstofelemente en die primêre koelmiddel te bevat in 'n reaktor, soos in subparagraaf (1) bedoel, teen 'n bedryfsdruk hoër as 5,1 MPa.
- (6) Primêre koelpompe spesiaal ontwerp of voorberei vir sirkulering van vloeimateriaal as primêre koelmiddel vir kernreaktors soos in subparagraaf (1) bedoel.
- (7) Sirkoniummetaal en -legerings in die vorm van buise of buissamestellings, spesiaal ontwerp of voorberei vir gebruik in 'n reaktor soos in subparagraaf (1) bedoel, en waarin die verhouding van hafnium tot sirkonium minder is as 1:500 dele per massa.

2. Aanlegte vir die herverwerking van bestraalde brandstofelemente en toerusting spesiaal daarvoor ontwerp of voorberei

- (1) Aanlegte vir die herwinning van splytbare materiale uit bestraalde kernbrandstof.
- (2) Opkapmasjiene vir bestraalde brandstofelemente spesiaal ontwerp of voorberei vir gebruik in 'n herverwerkingsaanleg en bedoel om bestraalde kernbrandstofelemente, bondels of stawe te sny, kap of knip.
- (3) Oplosvate wat kritiek veilige tenks is (bv. klein deursnee, ringvormige of plat tenks) spesiaal ontwerp of voorberei vir gebruik in 'n herverwerkingsaanleg bedoel vir die oplosing van bestraalde kernbrandstof en wat in staat is om warm, hoogs korrosiewe vloeistof te weerstaan en wat afstandgelaai en op afstand in stand gehou kan word.
- (4) (a) Oplosmiddelkstraherders en oplosmiddelkstraksietoerusting soos gepakte of pulskolomme, mengselbesinkers of sentrifugale kontaktors spesiaal ontwerp of voorberei vir gebruik in 'n aanleg vir die herverwerking van bestraalde brandstof.

- (3) Reactor fuel charging and discharging machines especially designed or prepared for inserting or removing fuel in a nuclear reactor referred to in subparagraph (1), which is capable of on-load operation or employing technically sophisticated positioning or alignment features to allow complex off-load fuelling operations such as those in which direct viewing of or access to the fuel is not normally available.
- (4) Reactor control rods especially designed or prepared for the control of the reaction rate in a nuclear reactor referred to in subparagraph (1).
- (5) Reactor pressure tubes which are especially designed or prepared to contain fuel elements and the primary coolant in a reactor referred to in subparagraph (1), at an operating pressure in excess of 5,1 MPa.
- (6) Primary coolant pumps especially designed or prepared for circulating liquid metal as primary coolant for nuclear reactors referred to in subparagraph (1).
- (7) Zirconium metal and alloys in the form of tubes or assemblies of tubes, especially designed or prepared for use in a reactor referred to in subparagraph (1), and in which the relation of hafnium to zirconium is less than 1:500 parts by mass.

2. Plants for the reprocessing of irradiated fuel elements and equipment, especially designed or prepared therefor

- (1) Plants for the recovery of fissionable materials from irradiated nuclear materials.
- (2) Irradiated fuel element chopping machines, remotely operated and especially designed or prepared for use in a reprocessing plant and intended to cut, chop or shear irradiated nuclear fuel assemblies, bundles or rods.
- (3) Dissolvers, which are critically safe tanks (e.g. small diameter, annular or slab tanks) especially designed or prepared for use in a reprocessing plant, intended for the dissolution of irradiated nuclear fuel and which are capable of withstanding hot, highly corrosive liquids and which can be remotely loaded and maintained.
- (4) (a) Solvent extractors and solvent extraction equipment such as packed or pulse columns, mixer settlers or centrifugal contactors especially designed or prepared for use in a plant for the reprocessing of irradiated fuel.

(b) Oplosmiddelelekstraheerders—

- (i) moet weerstand bied teen die korrosiewe uitwerking van salpetersuur; en
- (ii) word normaalweg volgens uiters hoë standarde vervaardig (met inbegrip van spesiale sweiswerk en inspeksie en kwaliteitsversekering- en kwaliteitbeheertegniese) van koolstofarm vlek-vry staal, titaan, sirkonium, of ander hoëkwaliteitsmateriaal.

(5) (a) Chemiese hou- of stoorvate spesiaal ontwerp of voorberei vir gebruik in 'n aanleg vir die herverwerking van bestraalde brandstof.

(b) Die hou- en stoorvate—

- (i) moet bestand wees teen die korrosiewe uitwerking van salpetersuur;
- (ii) word gewoonlik vervaardig van materiaal soos koolstofarm vlek-vry staalsoorte, titaan of sirkonium, of ander hoëkwaliteitsmateriaal; en
- (iii) kan ontwerp word vir afstandbediening en -onderhoud en kan die volgende eienskappe hê vir die beheer van kernkritikaliteit:
 - (aa) Wande of binnestrukture met 'n boorekwivalent van minstens 2%; of
 - (bb) 'n maksimum deursnee van 175 mm vir silindriese vate; of
 - (cc) 'n maksimum wydte van 75 mm vir óf plat óf ringvormige vate.

(6) Plutoniumnitraat-tot-oksiedomsettingstelsels spesiaal ontwerp of voorberei vir die omsetting van plutoniumnitraat in plutoniumoksied, in die besonder aangepas om kritikaliteit en stralingseffekte te verhoed en om toksisiteitsgevaare te verminder.

(7) Plutoniumoksied-tot-metaalproduksiestelsels spesiaal ontwerp of voorberei vir die produksie van plutoniummetaal, in die besonder aangepas om kritikaliteit en stralingseffekte te verhoed en om toksisiteitsgevaare te verminder.

3. Aanlegte vir die vervaardiging van brandstof-elemente

'n "Aanleg vir die vervaardiging van brandstof-elemente" sluit die toerusting in—

- (a) wat normaalweg regstreeks in aanraking kom met die produksievloei van kernmateriaal, of dit regstreeks prosesseer of beheer; of
- (b) wat die kernmateriaal binne-in die bekleding afdig.

(b) Solvent extractors—

- (i) must be resistant to the corrosive effect of nitric acid; and
- (ii) 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.

(5) (a) Chemical holding or storage vessels especially designed or prepared for use in a plant for the reprocessing of irradiated fuel.

(b) The holding or storage vessels—

- (i) must be resistant to the corrosive effect of nitric acid;
- (ii) are normally fabricated of materials such as low carbon stainless steels, titanium or zirconium, or other high quality materials; and
- (iii) may be designed for remote operation and maintenance and may have the following features for control of nuclear criticality:
 - (aa) Walls or internal structures with a boron equivalent of at least 2%; or
 - (bb) a maximum diameter of 175 mm for cylindrical vessels; or
 - (cc) a maximum width of 75 mm for either a slab or annular vessel.

(6) Plutonium nitrate to oxide conversion 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.

(7) Plutonium oxide to metal production 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.

3. Plants for the fabrication of fuel elements

A "plant for the fabrication of fuel elements" includes the equipment—

- (a) which normally comes in direct contact with, or directly processes, or controls, the production flow of nuclear material; or
- (b) which seals the nuclear material within the cladding.

4. Aanlegte vir die skeiding van isotope van uraan en toerusting, buiten analitiese instrumente, spesiaal daarvoor ontwerp en voorberei

- (1) Gassentrifuges en samestellings en komponente spesiaal ontwerp of voorberei vir gebruik in gassentrifuges, met inbegrip van—
 - (a) roterende komponente soos volledige rotorsamestellings, rotorbuise, ringe of balge, skotte en bo- en onderdoppe;
 - (b) statiese komponente soos magnetiese suspensielaers, laers en dempers, molekulêre pompe en motorstators;
 - (c) spesiaal ontwerpte of voorbereide hulpstelsels, toerusting en komponente vir gassentrifugeverrykingsaanlegte, met inbegrip van—
 - (i) toevoerstelsels en produk- en gestroopte uraanonttrekkingstelsels;
 - (ii) masjienhoofpypstelsels;
 - (iii) UF_6 massaspektrometers en ionbronne; en
 - (iv) frekwensieverskuiwers.
- (2) Spesiaal ontwerpte of voorbereide samestellings en komponente in gasdiffusieverryking, met inbegrip van—
 - (a) gasdiffusiemembrane;
 - (b) diffusorhulsels;
 - (c) kompressors en gasblasers;
 - (d) roteerasseëls;
 - (e) hiteruilers vir afkoel van UF_6 ; en
 - (f) spesiaal ontwerpte of voorbereide hulpstelsels, toerusting en komponente vir gebruik in gasdiffusie-verryking, met inbegrip van—
 - (i) toevoerstelsels en produk- en gestroopte uraanonttrekkingstelsels;
 - (ii) hoofpypstelsels;
 - (iii) vakuumstelsels;
 - (iv) spesiale afsluit- en beheerklappe; en
 - (v) UF_6 massaspektrometers en ionbronne.
- (3) Spesiaal ontwerpte of voorbereide stelsels, toerusting en komponente vir gebruik in aërodinamiese verrykingsaanlegte, met inbegrip van—
 - (a) skeidingsnossels;
 - (b) werwelbuise;
 - (c) kompressors en gasblasers;

4. Plants for the separation of isotopes of uranium and equipment, other than analytical instruments, especially designed or prepared therefor

- (1) Gas centrifuges and assemblies and components especially designed or prepared for use in gas centrifuges, including—
 - (a) rotating components such as complete rotor assemblies, rotor tubes, rings or bellows, baffles and top and bottom caps;
 - (b) static components such as magnetic suspension bearings, bearings and dampers, molecular pumps and motor stators;
 - (c) especially designed or prepared auxiliary systems, equipment and components for gas centrifuge plants, including—
 - (i) feed systems and product and tails withdrawal systems;
 - (ii) machine header piping systems;
 - (iii) UF_6 mass spectrometers and ion sources; and
 - (iv) frequency changers.
- (2) Especially designed or prepared assemblies and components for use in gaseous diffusion enrichment, including—
 - (a) gaseous diffusion barriers;
 - (b) diffusor housings;
 - (c) compressors and gas blowers;
 - (d) rotary shaft seals;
 - (e) heat exchangers for cooling UF_6 ; and
 - (f) especially designed or prepared auxiliary systems, equipment and components for use in gaseous diffusion enrichment, including—
 - (i) feed systems and product and tails withdrawal systems;
 - (ii) header piping systems;
 - (iii) vacuum systems;
 - (iv) special shut-off and control valves; and
 - (v) UF_6 mass spectrometers and ion sources.
- (3) Especially designed or prepared systems, equipment and components for use in aerodynamic enrichment plants, including—
 - (a) separation nozzles;
 - (b) vortex tubes;
 - (c) compressors and gas blowers;

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| <ul style="list-style-type: none"> (d) roteerasseëls; (e) hiteruilers vir gasafkoeling; (f) skeidingselementhulsels; (g) toevoerstelsels en produk- en gestroopte uraanonttrekkingstelsels; (h) hoofpypstelsels; (i) vakuumbstelsels en -pompe; (j) spesiale afsluit- en beheerklappe; (k) UF_6 massaspektrometers en ionbronne; en (l) UF_6 en draergas skeidingstelsels. <p>(4) Spesiaal ontwerpte of voorbereide stelsels, toerusting en komponente vir gebruik in chemiese ruiling- of ionruilingverrykingsaanlegte, met inbegrip van —</p> <ul style="list-style-type: none"> (a) vloeistof-vloeistof ruilingskolomme (chemiese ruiling); (b) vloeistof- vloeistof sentrifugale kontak-tors (chemiese ruiling); (c) uraanreduksiestelsels en toerusting (chemiese ruiling); (d) stelsels vir toevoervoorbereiding (chemiese ruiling); (e) uraanoksidasiestelsels (chemiese ruiling); (f) vinning-reagerende ionruilingsharse en absorbense (ioonruiling); (g) ionruilingskolomme (ioonruiling); en (h) ionruilingrefluksstelsels (ioonruiling). <p>(5) Spesiaal ontwerpte of voorbereide stelsels, toerusting en komponente vir gebruik vir laserisotoopskeidingsaanlegte, met inbegrip van —</p> <ul style="list-style-type: none"> (a) uraanverdampingstelsels (AVLIS); (b) uraanvloeimetalaal hanteringstelsels (AVLIS); (c) uraanmetaal produk- en uitskotopvangstelsels (AVLIS); (d) skeidingsmodulehulsels (AVLIS); (e) supersoniese uitsettingsnossels (MLIS); (f) uraanpentafluoried produkopvangers (MLIS); (g) UF_6 met draergas kompressors (MLIS); (h) roteerasseëls (MLIS); (i) fluorineringsstelsels (MLIS); (j) UF_6 massaspektrometers en ionbronne (MLIS); (k) toevoerstelsels en produk- en gestroopte uraanonttrekkingstelsels (MLIS); (l) UF_6 en draergas skeidingstelsels (MLIS); en (m) laserstelsels (AVLIS, MLIS en CRISLA). | <ul style="list-style-type: none"> (d) rotary shaft seals; (e) heat exchangers for gas cooling; (f) separation element housings; (g) feed systems and product and tails withdrawal systems; (h) header piping systems; (i) vacuum systems and pumps; (j) special shut-off and control valves; (k) UF_6 mass spectrometers and ion sources; and (l) UF_6 and carrier gas separation systems. <p>(4) Especially designed or prepared systems, equipment and components for use in chemical exchange or ion exchange enrichment plants, including —</p> <ul style="list-style-type: none"> (a) liquid-liquid exchange columns (chemical exchange); (b) liquid-liquid centrifugal contractors (chemical exchange); (c) uranium reduction systems and equipment (chemical exchange); (d) feed preparation systems (chemical exchange); (e) uranium oxidation systems (chemical exchange); (f) fast-reacting ion exchange resins and absorbends (ion exchange); (g) ion exchange columns (ion exchange); and (h) ion exchange reflux systems (ion exchange). <p>(5) Especially designed or prepared systems, equipment and components for use in laser-based enrichment plants, including —</p> <ul style="list-style-type: none"> (a) uranium vaporization systems (AVLIS); (b) liquid uranium metal handling systems (AVLIS); (c) uranium metal 'product' and 'tails' collector assemblies (AVLIS); (d) separator module housings (AVLIS); (e) supersonic expansion nozzles (MLIS); (f) uranium pentafluoride product collectors (MLIS); (g) UF_6 with carrier gas compressors (MLIS); (h) rotary shaft seals (MLIS); (i) fluorination systems (MLIS); (j) UF_6 mass spectrometers and ion sources (MLIS); (k) feed systems and product and tails withdrawal systems (MLIS); (l) UF_6 and carrier gas separation systems (MLIS); and (m) laser systems (AVLIS, MLIS and CRISLA). |
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| <p>(6) Spesiaal ontwerpte of voorbereide stelsels, toerusting en komponente vir gebruik vir plasma-isotoopskeidingsaanlegte, met inbegrip van—</p> <ul style="list-style-type: none"> (a) mikrogolffragbronne en antennes; (b) ionopwekkingspoele; (c) uraanplasmaontwikkelaars; (d) uraanvloeietaalhanteringsstelsels; (e) uraanmetaal produk- en uitskotopvangstelsels; en (f) skeidingsmodulehulsels. <p>(7) Spesiaal ontwerpte of voorbereide stelsels, toerusting en komponente vir gebruik in elektromagnetiese isotoopskeidingsaanlegte, met inbegrip van—</p> <ul style="list-style-type: none"> (a) elektromagnetiese isotoopskeiers; (b) hoëspanningskragbronne; en (c) magneetkragbronne. <p>5. Aanlegte vir die produksie van swaarwater, deuterium en deuteriumverbindings en toerusting spesiaal daarvoor ontwerp of voorberei</p> <ul style="list-style-type: none"> (1) Water-waterstofsulfiedruiltorings. (2) Blasers en kompressors. (3) Ammoniak-waterstofruiltorings. (4) Toringbinnewerk en fasepompe. (5) Ammoniakkrakers. (6) Infrarooi-absorpsieontleders. (7) Katalitiese branders. | <p>(6) Especially designed or prepared systems, equipment and components for use in plasma separation enrichment plants, including—</p> <ul style="list-style-type: none"> (a) microwave power sources and antennae; (b) ion excitation coils; (c) uranium plasma generation systems; (d) liquid uranium metal handling systems; (e) uranium metal 'product' and 'tails' collector assemblies; and (f) separator module housings. <p>(7) Especially designed or prepared systems, equipment and components for use in electromagnetic enrichment plants, including—</p> <ul style="list-style-type: none"> (a) electromagnetic isotope separators; (b) high voltage power supplies; and (c) magnet power supplies. <p>5. Plants for the production of heavy water, deuterium and deuterium compounds and equipment especially designed or prepared therefore</p> <ul style="list-style-type: none"> (1) Water-hydrogen sulphide exchange towers. (2) Blowers and compressors. (3) Ammonia-hydrogen exchange towers. (4) Tower internals and stage pumps. (5) Ammonia crackers. (6) Infrared absorption analyzers. (7) Catalytic burners. |
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