



International Atomic Energy Agency

## Information Circular

(Unofficial electronic edition)

INFCIRC/254  
February 1978

GENERAL Distr.  
Original: ENGLISH, FRENCH  
and RUSSIAN

### Communication Received from Certain Member States Regarding Guidelines for the Export of Nuclear Material, Equipment or Technology

1. On 11 January 1978, the Director General received similar letters, all of that date, from the Resident Representatives to the Agency of Czechoslovakia, France, the German Democratic Republic, Japan, Poland, Switzerland, the Union of Soviet Socialist Republics and the United States of America, relating to the export of nuclear material, equipment or technology. In the light of the request at the end of each of those letters, the text is reproduced below as Letter I.
2. On the same day, the Resident Representatives to the Agency of Canada and Sweden also addressed analogous letters to the Director General. In the light of the request expressed at the end of each of those letters, their texts are reproduced below as Letter II and Letter III respectively.
3. On the same day, the Director General received similar letters from the Resident Representatives to the Agency of Belgium, the Federal Republic of Germany, the Netherlands and the United Kingdom of Great Britain and Northern Ireland, Members of the European Communities, relating to the export of nuclear material, equipment or technology. In the light of the request expressed at the end of each of those letters, the text is reproduced below as Letter IV.
4. On 11 January 1978 the Resident Representative to the Agency of Italy, a Member of the European Communities, addressed a letter to the Director General relating to the same subject, the text of which is reproduced below as Letter V.
5. On 11 January 1978 the Director General received complementary letters, all of that date, from the Resident Representatives to the Agency of Belgium, Czechoslovakia, the German Democratic Republic, Japan, Poland, Switzerland and the Union of Soviet Socialist Republics, the texts of which are reproduced below as Letters VI, VII, VIII, IX, X, XI and XII respectively.
6. The attachments to Letters I-V, which are in every case identical, setting forth the Guidelines for Nuclear Transfers with their Annexes, are reproduced in the Appendix.

On 28 June 2002 an addendum was issued to this document ([INFCIRC/254/Rev.5/Part1/Add.2](#))

#### Letter I

The Permanent Mission of ..... presents its compliments to the Director General of the International Atomic Energy Agency and has the honour to enclose copies of three documents which have been the subject of discussion between the Government of ..... and a number of other Governments.

The Government of ..... has decided that, when considering the export of nuclear material, equipment or technology, it will act in accordance with the principles contained in the attached documents.

In reaching this decision, the Government of ..... is fully aware of the need to contribute to the development of nuclear power in order to meet world energy requirements, while avoiding contributing in any way to the dangers of a proliferation of nuclear weapons or other nuclear explosive devices, and of the need to remove safeguards and non-proliferation assurances from the field of commercial competition.

The Government of..... hopes that other Governments may also decide to base their own nuclear export policies upon these documents.

The Government of ..... requests that the Director General of the International Atomic Energy Agency should circulate the texts of this note and its enclosures to all Member Governments for their information and as a demonstration of support by the Government of.....for the Agency's non-proliferation objectives and safeguards activities.

The Permanent Mission of ..... avails itself of this opportunity to renew to the Director General of the International Atomic Energy Agency the assurances of its highest consideration.

## **Letter II**

The Permanent Mission of Canada to the IAEA presents its compliments to the Director General and has the honour to enclose copies of three documents that have been the subject of discussion between the Government of Canada and a number of other Governments.

The Government of Canada has decided that, when considering the export of nuclear material, equipment or technology, it will act in accordance with the principles contained in the attached documents as well as other principles considered pertinent by it.

In reaching this decision, the Government of Canada is fully aware of the need to contribute to the development of nuclear power in order to meet world energy requirements, while avoiding contributing in any way to the dangers of a proliferation of nuclear weapons or other nuclear explosive devices, and of the need to remove safeguards and non-proliferation assurances from the field of commercial competition.

The Government of Canada hopes that other Governments may also decide to base their own nuclear export policies upon these documents and such further principles as may be agreed upon.

The Government of Canada requests that the Director General of the International Atomic Energy Agency should circulate the text of this Note and its enclosures to all Member Governments for their information and as a demonstration of support by the Government of Canada for the Agency's non-proliferation objectives and safeguard activities.

The Permanent Mission of Canada to the IAEA avails itself of this opportunity to renew to the Director General the assurances of its highest consideration.

## **Letter III**

The Permanent Mission of Sweden present their compliments to the Director General of the International Atomic Energy Agency have the honour to enclose copies of three documents which have been the subject of discussion between the Government of Sweden and a number of other Governments.

The Government of Sweden have decided that, when considering the export of nuclear material, equipment or technology, they will act in accordance with the principles contained in the attached documents.

In reaching this decision, the Government of Sweden are fully aware of the need to avoid contributing in any way to the dangers of a proliferation of nuclear weapons or other nuclear explosive devices, and of the need to remove safeguards and non-proliferation assurances from the field of commercial competition.

The Government of Sweden hope that other Governments may also decide to base their own nuclear export policies upon these documents.

The Government of Sweden request that the Director General of the International Atomic Energy Agency should circulate the text of this Note and its enclosures to all Member Governments for their information and as a demonstration of support by the Government of Sweden for the Agency's non-proliferation objectives and safeguards activities.

The Permanent Mission of Sweden take this opportunity to renew to the Director General of the International Atomic Energy Agency the assurances of their highest consideration.

#### **Letter IV**

The Permanent Mission of..... to the International Organizations in Vienna presents its compliments to the Director General of the International Atomic Energy Agency and has the honour to enclose copies of three documents which have been the subject of discussion between the ..... and a number of other Governments.

The Government of.....has decided that, when considering the export of nuclear material, equipment or technology, it will act in accordance with the principles contained in the attached documents.

In reaching this decision, the Government of ..... is fully aware of the need to contribute to the development of nuclear power in order to meet world energy requirements, while avoiding contributing in any way to the dangers of a proliferation of nuclear weapons or other nuclear explosive devices, and of the need to remove safeguards and non-proliferation assurances from the field of commercial competition.

As a Member of the European Community, the Government of ..... so far as trade within the Community is concerned, will implement these documents in the light of its commitments under the Treaties of Rome where necessary.

The Government of ..... hopes that other Governments may also decide to base their own nuclear export policies upon the these documents.

The Government of ..... requests that the Director General of the International Atomic Energy Agency should circulate the texts of this Note and its enclosures to all Member Governments for their information and as a demonstration of support by the Government of ..... for the Agency's non-proliferation objectives and safeguards activities.

The Permanent Mission of ..... to the International Organizations in Vienna avails itself of this opportunity to renew to the Director General of the International Atomic Energy Agency the assurances of its highest consideration.

#### **Letter V**

The Permanent Mission of Italy present their compliments and have the honour to enclose copies of three documents which have been the subject of discussion between the Government of Italy and a number of other Governments.

The Government of Italy have decided that, when considering the export of nuclear material, equipment or technology, they will act in accordance with the principles contained in the attached documents.

In reaching this decision, the Government of Italy are fully aware of the need to contribute to the development of nuclear power in order to meet world energy requirements, while avoiding contributing in any way to dangers of a proliferation of nuclear weapons or other nuclear explosive devices, and of the need to remove safeguards and non-proliferation assurances from the field of commercial competition.

The Italian Government underline that the undertaking referred to cannot limit in any way the rights and obligations arising for Italy out of agreements to which she is a Party, and in particular those arising out of Article IV of the Non-Proliferation Treaty.

As a Member of the European Community, the Government of Italy, so far as trade within the Community is concerned, will implement these documents in the light of their commitments under the Treaties of Rome where necessary.

The Government of Italy hope that other Governments may also decide to base their own nuclear export policies upon these documents.

The Government of Italy request that the Director General of the International Atomic Energy Agency should circulate the texts of this Note and its enclosures to all Member Governments for their information and as a demonstration of support by the Government of Italy for the Agency's non-proliferation objectives and safeguards activities.

#### **Letter VI**

The Permanent Mission of Belgium presents its compliments to the Director General of the IAEA and, in addition to its Note P 10-92/24 of 11 January 1978, would like to draw the attention to the following.

The Government of Belgium at present are not in a position to implement fully the principles for technology transfer set out in the documents attached to the above-mentioned Note because of the lack of appropriate laws and regulations. However, the Government of Belgium intend to implement these principles fully when appropriate laws and regulations for this purpose are put into force as necessary.

The Government of Belgium request that the Director General of the IAEA should circulate the text of this Note to all Member Governments for their information.

The Permanent Mission of Belgium takes this opportunity to renew to the Director General of the IAEA the assurance of its highest consideration.

#### **Letter VII**

The Permanent Mission of the Czechoslovak Socialist Republic to the International Organizations presents its compliments to the Director General of the International Atomic Energy Agency and has the honour to refer to its Note No. 1036/78 regarding standards of the nuclear export policies which have been adopted by the members of the Nuclear Suppliers Group.

The Government of the Czechoslovak Socialist Republic greatly appreciates the role of the International Atomic Energy Agency in the sphere of control of the provisions of the Non-Proliferation Treaty. This activity has been an important instrument of preventing proliferation of nuclear weapons. Sharing the opinion that further strengthening of safeguards lies in the interest of universal peace, the Government of the Czechoslovak Socialist Republic has decided that it would deliver nuclear material, equipment and technology defined in a trigger list, to any non-nuclear-weapon State only in a case when the whole nuclear activity of a recipient country, and not only material, equipment and technology being transferred, are subject to the Agency's safeguards.

The Government of the Czechoslovak Socialist Republic expressed its opinion that this principle, if observed by all the States - nuclear suppliers, could have made a great contribution toward strengthening and universality of the Non-Proliferation Treaty.

The Permanent Mission of the Czechoslovak Socialist Republic to the International Organizations avails itself of this opportunity to renew to the Director General of the International Atomic Energy Agency the assurances of its highest consideration.

### **Letter VIII**

The Permanent Mission of the German Democratic Republic to the International Organizations in Vienna presents its compliments to the Director General of the International Atomic Energy Agency and has the honour, in connection with Note No. 2/78-III addressed to the Director General of the IAEA on 11 January 1978, to state the following: in the view of the Government of the German Democratic Republic, the guidelines for nuclear exports are such as to strengthen the regime of non-proliferation of nuclear weapons and the IAEA safeguards system. The German Democratic Republic will also in future advocate agreements to the effect that nuclear exports under the trigger list mentioned in the above Note should go only to those non-nuclear-weapon States that accept IAEA safeguards for all of their nuclear activities.

The Government of the German Democratic Republic is convinced that any reinforcement of the regime of non-proliferation of nuclear weapons will promote the peaceful uses of nuclear energy and international co-operation in this area.

The Permanent Mission requests that the present text be circulated as an official document of the International Atomic Energy Agency.

The Permanent Mission of the German Democratic Republic to the International Organizations in Vienna avails itself of this opportunity to renew to the Director General of the International Atomic Energy Agency the assurances of its highest consideration.

### **Letter IX**

The Embassy of Japan presents its compliments to the International Atomic Energy Agency and, in reference to its Note No. J.M. 78/21 of January 11, 1978, has the honour to inform the International Atomic Energy Agency of the following.

The Government of Japan at present is not in a position to implement fully the Principles for Technology Transfers set out in the documents attached to the above-mentioned Note because of the lack of appropriate laws and regulations.

However, the Government of Japan intends to implement these principles fully when appropriate laws and regulations for this purpose are put into force as necessary.

The Government of Japan requests that the Director General of the International Atomic Energy

Agency be good enough to circulate the texts of this Note to all Member Governments for their information.

The Embassy of Japan avails itself of this opportunity to renew to the International Atomic Energy Agency the assurances of its highest consideration.

### **Letter X**

The Permanent Mission of the Polish People's Republic to the International Atomic Energy Agency presents its compliments to the Director General of the IAEA and has the honour to refer to its Note No. 10-96/77 regarding standards of the nuclear export policies which have been adopted by the members of the Nuclear Suppliers Group.

The Government of the Polish People's Republic greatly appreciates the role of the International Atomic Energy Agency in the sphere of control of the provisions of the Non-Proliferation Treaty. This activity has been an important instruments of preventing proliferation of nuclear weapons. Sharing the opinion that further strengthening of safeguards lies in the interest of universal peace, the Government of the Polish People's Republic has decided that it would deliver nuclear material, equipment and technology defined in a trigger list, to any non-nuclear-weapon State only in a case when the whole nuclear activity of a recipient country, and not only material, equipment and technology being transferred, are subject to the Agency's safeguards.

The Government of the Polish People's Republic expresses its opinion that this principle, if observed by all the States - nuclear suppliers, could have made a great contribution toward strengthening and universality of the Non-Proliferation Treaty.

The Government of the Polish People's Republic requests that the Director General of the IAEA should circulate the text of this Note to all Member Governments.

The Permanent Mission of the Polish People's Republic to the International Atomic Energy Agency avails itself of this opportunity to renew to the Director General of the IAEA the assurances of the highest consideration.

### **Letter XI**

The Permanent Mission of Switzerland presents its compliments to the Director General of the International Atomic Energy Agency and, with reference to its to day's Note No. 003, has the honour to emphasize the following.

The Government of Switzerland at present is not in a position to implement fully the principles for Technology Transfers set out in the documents attached to the above-mentioned Note because of the lack of appropriate laws and regulations. However, the Government of Switzerland intends to implement these principles fully when appropriate laws and regulations for this purpose are put into force as necessary.

The Government of Switzerland requests that the Director General of the International Atomic Energy Agency should circulate the text of this Note to all Member Governments for their information.

The Permanent Mission of Switzerland avails itself of this opportunity to renew to the Director General of the International Atomic Energy Agency the assurances of its highest consideration.

### **Letter XII**

With reference to Note Verbale No. 1 from the Permanent Mission of the USSR, dated 11 January 1978, I have the honour to send you the following Declaration of the Government of the USSR:

"The Government of the Union of Soviet Socialist Republics emphasizes its determination to continue its efforts to secure agreement between countries supplying nuclear materials, equipment and technology on the principle that IAEA safeguards must be applied to all nuclear activities of non-nuclear-weapon States when those States receive any of the items mentioned in the initial list referred to in the above-mentioned Note Verbale. In this connection the Government of the USSR takes the view that the principle of full control is a necessary condition for ensuring effective safeguards which can prevent nuclear materials, equipment and technology from being used for manufacturing nuclear weapons or other nuclear explosive devices. "

The Government requests that the text of the present letter be distributed as an official document of the IAEA.

### *Appendix*

#### **Guidelines for Nuclear Transfers**

1. The following fundamental principles for safeguards and export controls should apply to nuclear transfers to any non-nuclear-weapon State for peaceful purposes. In this connection, suppliers have defined an export trigger list and agreed on common criteria for technology transfers.

#### **Prohibition on nuclear explosives**

2. Suppliers should authorize transfer of items identified in the trigger List only upon formal governmental assurances from recipients explicitly excluding uses which would result in any nuclear explosive device.

#### **Physical protection**

- a. All nuclear materials and facilities identified by the agreed trigger list should be placed under effective physical protection to prevent unauthorized use and handling. The levels of physical protection to be ensured in relation to the type of materials, equipment and facilities, have been agreed by suppliers, taking account of international recommendations.
- b. The implementation of measures of physical protection in the recipient country is the responsibility of the Government of that country. However, in order to implement the terms agreed upon amongst suppliers, the levels of physical protection on which these measures have to be based should be the subject of an agreement between supplier and recipient.
- c. In each case special arrangements should be made for a clear definition of responsibilities for the transport of trigger list items.

#### **Safeguards**

3. Suppliers should transfer trigger list items only when covered by IAEA safeguards, with duration and coverage provisions in conformance with the GOV/1621 guidelines. Exceptions

should be made only after consultation with the parties to this understanding.

4. Suppliers will jointly reconsider their common safeguards requirements, whenever appropriate.

#### **Safeguards triggered by the transfer of certain technology**

5.
  - a. The requirements of paragraphs 2, 3 and 4 above should also apply to facilities for reprocessing, enrichment, or heavy-water production, utilizing technology directly transferred by the supplier or derived from transferred facilities, or major critical component thereof.
  - b. The transfer of such facilities, or major critical components thereof, or related technology, should require an undertaking (1) that IAEA safeguards apply to any facilities of the same type (i.e. if the design, construction or operating processes are based on the same or similar physical or chemical processes, as defined in the trigger list) constructed during an agreed period in the recipient country and (2) that there should at all times be in effect a safeguards agreement permitting the IAEA to apply Agency safeguards with respect to such facilities identified by the recipient, or by the supplier in consultation with the recipient, as using transferred technology.

#### **Special controls on sensitive exports**

6. Suppliers should exercise restraint in the transfer of sensitive facilities, technology and weapons-usable materials. If enrichment or reprocessing facilities, equipment or technology are to be transferred, suppliers should encourage recipients to accept, as an, alternative to national plants, applicant involvement and/or other appropriate multinational participation in resulting facilities, Suppliers should also promote international (including IAEA) activities concerned with multinational regional fuel cycle centres.

#### **Special controls on export of enrichment facilities, equipment and technology**

7. For a transfer of an enrichment facility, or technology therefor, the recipient nation should agree that neither the transferred facility, nor any facility based on such technology, will be designed or operated for the production of greater than 20% enriched uranium without the consent of the supplier nation, of which the IAEA should be advised.

#### **Controls on supplied or derived weapons-usable material**

8. Suppliers recognize the importance, in order to advance the objectives of these guidelines and to provide opportunities further to reduce the risks of proliferation, of including in agreements on supply of nuclear materials or of facilities which produce weapons-usable material, provisions calling for mutual agreement between the supplier and the recipient on arrangements for reprocessing, storage, alteration, use, transfer or retransfer of any weapons-usable material involved, Suppliers should endeavour to include such provisions whenever appropriate and practicable.

#### **Controls on retransfer**

9.
  - a. Suppliers should transfer trigger list items, including technology defined under paragraph 6, only upon the recipient's assurance that in the case of

1. retransfer of such items,

or

2. transfer of trigger list items derived from facilities originally transferred by the supplier, or with the help of equipment or technology originally transferred by the supplier;

the recipient of the retransfer or transfer will have provided the same assurances as those required by the supplier for the original transfer.

- b. In addition the supplier's consent should be required for (1) any retransfer of the facilities, major critical components, or technology described in paragraph 6; (2) any transfer of facilities or major critical components derived from those items; (3) any retransfer of heavy water or weapons-usable material

## SUPPORTING ACTIVITIES

### **Physical security**

10. Suppliers should promote international co-operation on the exchange of physical security information, protection of nuclear materials in transit, and recovery of stolen nuclear materials and equipment.

### **Support for effective IAEA safeguards**

11. Suppliers should make special efforts in support of effective implementation of IAEA safeguards. Suppliers should also support the Agency's efforts to assist Member States in the improvement of their national systems of accounting and control of nuclear material and to increase the technical effectiveness of safeguards.

Similarly, they should make every effort to support the IAEA in increasing further the adequacy of safeguards in the light of technical developments and the rapidly growing number of nuclear facilities, and to support appropriate initiatives aimed at improving the effectiveness of IAEA safeguards.

### **Sensitive plant design features**

12. Suppliers should encourage the designers and makers of sensitive equipment to construct it in such a way as to facilitate the application of safeguards.

### **Consultations**

13.
  - a. Suppliers should maintain contact and consult through regular channels on matters connected with the implementation of these guidelines.
  - b. Suppliers should consult, as each deems appropriate, with other Governments concerned on specific sensitive cases, to ensure that any transfer does not contribute to risks of conflict or instability.
  - c. In the event that one or more suppliers believe that there has been a violation of supplier/recipient understandings resulting from these guidelines, particularly in the case of an explosion of a nuclear device, or illegal termination or violation of IAEA

safeguards by a recipient, suppliers should consult promptly through diplomatic channels in order to determine and assess the reality and extent of the alleged violation.

Pending the early outcome of such consultations, suppliers will not act in a manner that could prejudice any measure that may be adopted by other suppliers concerning their current contacts with that recipient.

Upon the findings of such consultations, the suppliers, bearing in mind Article XII of the IAEA Statute, should agree on an appropriate response and possible action which could include the termination of nuclear transfers to that recipient.

14. In considering transfers, each supplier should exercise prudence having regard to all the circumstances of each case, including any risk that technology transfers not covered by paragraph 6, or subsequent retransfers, might result in unsafeguarded nuclear materials.
15. Unanimous consent is required for any changes in these guidelines, including any which might result from the reconsideration mentioned in paragraph 5

## *Annex A*

### **Trigger List Referred to in Guidelines**

#### PART A. MATERIAL AND EQUIPMENT

1. Source or special fissionable material as defined in Article XX of the Statute of the International Atomic Energy Agency; provided that items specified in sub-paragraph (a) below, and exports of source or special fissionable material to a given recipient country, within a period of 12 months, below the limits specified in sub-paragraph (b) below, shall not be included:
  - a. Plutonium with an isotopic concentration of plutonium-238 exceeding 80%.
 

Special fissionable material when used in gram quantities or less as a sensing component in instruments; and

Source material which the Government is satisfied is to be used only in non-nuclear activities, such as the production of alloys or ceramics;
  - b. Special fissionable material
 

50 effective grams;

Natural uranium

500 kilograms;

Depleted uranium

1000 kilograms; and

Thorium

1000 kilograms.

## 2.1. *Reactors and equipment therefor:*

2.1.1. Nuclear reactors capable of operation so as to maintain a controlled self-sustaining fission chain reaction, excluding zero energy reactors, the latter being defined as reactors with a designed maximum rate of production of plutonium not exceeding 100 grams per year.

### 2.1.2. Reactor pressure vessels:

Metal vessels, as complete units or as major shop-fabricated parts therefor, which are especially designed or prepared to contain the core of a nuclear reactor as defined in paragraph 2.1.1. above and are capable of withstanding the operating pressure of the primary coolant.

### 2.1.3. Reactors fuel charging and discharging machines:

Manipulative equipment especially designed or prepared for inserting or removing fuel in a nuclear reactor as defined in paragraph 2.1.1. above 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;

### 2.1.4. Reactor control rods:

Rods especially designed or prepared for the control of the reaction rate in a nuclear reactor as defined in paragraph 2.1.1. above.

### 2.1.5. Reactor pressure tubes:

Tubes which are especially designed or prepared to contain fuel elements and the primary coolant in a reactor as defined in paragraph 2.1.1 above at an operating pressure in excess of 50 atmospheres.

### 2.1.6. Zirconium tubes:

Zirconium metal and alloys in the form of tubes or assemblies of tubes, and in quantities exceeding 500 kg per year, especially designed or prepared for use in a reactor as defined in paragraph 2.1.1 above, and in which the relationship of hafnium to zirconium is less than 1:500 parts by weight.

### 2.1.7. Primary coolant pumps:

Pumps especially designed or prepared for circulating liquid metal as primary coolant for nuclear reactors as defined in paragraph 2.1.1 above.

## 2. 2. *Non-nuclear materials for reactors:*

### 2.2.1. Deuterium and heavy water:

Deuterium and any deuterium compound in which the ratio of deuterium to hydrogen exceeds 1:5000 for use in a nuclear reactor as defined in paragraph 2.1.1 above in

quantities exceeding 200 kg of deuterium atoms for any one recipient country in any period of 12 months.

#### 2.2.2. Nuclear grade graphite:

Graphite having a purity level better than 5 parts per million boron equivalent and with a density greater than 1.50 grams per cubic centimetre in quantities exceeding 30 metric tons for any one recipient country in any period of 12 months.

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

2.4.1. Plants for the fabrication of fuel elements.

2.5.1. Equipment, other than analytical instruments, especially designed or prepared for the separation of isotopes of uranium.

2.6.1. Plants for the production of heavy water, deuterium and deuterium compounds and equipment especially designed or prepared therefor.

Clarifications of certain of the items on the above list are annexed.

## PART B. COMMON CRITERIA FOR TECHNOLOGY TRANSFERS UNDER PARAGRAPH 6 OF THE GUIDELINES

1. "Technology" means technical data in physical form designated by the supplying country as important to the design, construction, operation, or maintenance of enrichment, reprocessing, or heavy water production facilities or major critical components thereof, but excluding data available to the public, for example, in published books and periodicals or that which has been made available internationally without restrictions upon its further dissemination.
2. "Major critical components" are:
  - a. in the case of an isotope separation plant of the gaseous diffusion type: *diffusion barrier*;
  - b. in the case of an isotope separation plant of the gas centrifuge type: *gas centrifuge assemblies corrosion-resistant to UF<sub>6</sub>*;
  - c. in the case of an isotope separation plant of the jet nozzle type: the *nozzle units*;
  - d. in the case of an isotope separation plant of the vortex type: the *vortex units*.
3. For facilities covered by paragraph 6 of the Guidelines for which no major critical component is described in paragraph 2 above, if a supplier nation should transfer in the aggregate a significant fraction of the items essential to the operation of such a facility, together with the knowhow for construction and operation of that facility, that transfer should be deemed to be a transfer of "facilities or major critical components thereof".
4. The definitions in the preceding paragraphs are solely for the purposes of paragraph 6 of the Guidelines and this Part B. which differ from those applicable to Part A of this Trigger List, which should not be interpreted as limited by such definition.

5. For the purposes of implementing paragraph 6 of the Guidelines, the following facilities should be deemed to be "of the same type (i. e. if their design, construction or operating processes are based on the same or similar physical or chemical processes)":

Where the technology transferred is such as to make possible the construction in the recipient State of a facility of the following type, or major critical components thereof:	The following will be deemed to be facilities of the same type:
(a) an isotope separation plant of the gaseous diffusion type.....	any other isotope separation plant using the gaseous diffusion process.
(b) an isotope separation plant of the gas centrifuge type.....	any other isotope separation plant using the gas centrifuge process.
(c) An isotope separation plant of the jet nozzle type.....	any other isotope separation plant using the jet nozzle process.
(d) an isotope separation plant of the vortex type.....	any other isotope separation plant using the vortex process.
(e) a fuel reprocessing plant using the solvent extraction process.....	any other fuel reprocessing plant using the solvent extraction process.
(f) a heavy water plant using the exchange process.....	any other heavy water plant using the exchange process.
(g) a heavy water plant using the electrolytic process.....	any other heavy water plant using the electrolytic process.
(h) a heavy water plant using the hydrogen distillation process.....	any other heavy water plant using the hydrogen distillation process.

*Note:* In the case of reprocessing, enrichment, and heavy water facilities whose design, construction, or operation processes are based on physical or chemical processes other than those enumerated above, a similar approach would be applied to define facilities "of the same type", and a need to define major critical components of such facilities might arise.

6. The reference in paragraph 6(b) of the Guidelines to "any facilities of the same type constructed during an agreed period in the recipient country" is understood to refer to such facilities (or major critical components thereof), the first operation of which commences within a period of at least 20 years from the date of the first operation of (1) a facility which has been transferred or incorporates transferred major critical components or of (2) a facility of the same type built after the transfer of technology. It is understood that during that period there would be a conclusive presumption that any facility of the same type utilized transferred technology. But the agreed period is not intended to limit the duration of the safeguards imposed or the duration of the right to identify facilities as being constructed or operated on the basis of or by the use of transferred technology in accordance with paragraph 6(b)(2) of the

Guidelines.

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## *Annex*

### **Clarifications of Items on the Trigger List**

#### **A. Complete nuclear reactors**

(Item 2.1.1 of the Trigger List)

1. A "nuclear reactor" basically includes the items within or attached directly to the reactor vessel, the equipment which controls the level of power in the core, and the components which normally contain or come in direct contact with or control the primary coolant of the reactor core.
2. The export of the whole set of major items within this boundary will take place only in accordance with the procedures of the Guidelines. Those individual items within this functionally defined boundary which will be exported only in accordance with the procedures of the Guidelines are listed in paragraphs 2.1.1 to 2.1.5.

The Government reserves to itself the right to apply the procedures of the Guidelines to other items within the functionally defined boundary.

3. It is not intended to exclude reactors which could reasonably be capable of modification to produce significantly more than 100 grams of plutonium per year. Reactors designed for sustained operation at significant power levels, regardless of their capacity for plutonium production, are not considered as "zero energy reactors".

#### **B. Pressure vessels**

(Item 2.1.2 of the Trigger List)

4. A top plate for a reactor pressure vessel is covered by item 2.1. 1 as a major shop-fabricated part of a pressure vessel.
5. Reactor internals (e. g. support columns and plates for the core and other vessel internals, control rod guide tubes, thermal shields, baffles, core grid plates, diffuser plates, etc. ) are normally supplied by the reactor supplier. In some cases, certain internal support components are included in the fabrication of the pressure vessel. These items are sufficiently critical to the safety and reliability of the operation of the reactor (and, therefore, to the guarantees and liability of the reactor supplier), so that their supply, outside the basic supply arrangement for the reactor itself, would not be common practice. Therefore, although the separate supply of these unique, especially designed and prepared, critical, large and expensive items would not necessarily be considered as falling outside the area of concern, such a mode of supply is considered unlikely.

#### **C. Reactor control rods**

(item 2. 1.4 of the Trigger List)

6. This item includes, in addition to the neutron absorbing part, the support or suspension structures therefor if supplied separately.

#### **D. Fuel reprocessing plants**

(Item 2. 3.1 of the Trigger List)

7. A "plant for the reprocessing of irradiated fuel elements" includes the equipment and components which normally come in direct contact with and directly control the irradiated fuel and the major nuclear material and fission product processing streams. The export of the whole set of major items within this boundary will take place only in accordance with the procedures of the Guidelines. In the present state of technology, the following items of equipment are considered to fall within the meaning of the phrase "and equipment especially designed or prepared therefor":
- a. Irradiated fuel element chopping machines: remotely operated equipment especially designed or prepared for use in a reprocessing plant as identified above and intended to cut, chop or shear irradiated nuclear fuel assemblies, bundles or rods; and
  - b. Critically safe tanks (e. g. small diameter, annular or slab tanks) especially designed or prepared for use in a reprocessing plant as identified above, intended for dissolution of irradiated nuclear fuel and which are capable of withstanding hot, highly corrosive liquid, and which can be remotely loaded and maintained;
8. The Government reserves to itself the right to apply the procedures of the Guidelines to other items within the functionally defined boundary.

#### **E. Fuel fabrication plants**

(Item 2. 4.1 of the Trigger List)

9. 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.
10. The export of the whole set of items for the foregoing operations will take place only in accordance with the procedures of the Guidelines. The Government will also give consideration to application of the procedures of the guidelines to individual items intended for any of the foregoing operations, as well as for other fuel fabrication operations such as checking the integrity of the cladding or the seal, and the finish treatment to the sealed fuel.

#### **F. Isotope separation plant equipment**

(Item 2. 5.1 of the Trigger List)

11. "Equipment, other than analytical instruments, especially designed or prepared for the separation of isotopes of uranium" includes each of the major items of equipment especially designed or prepared for the separation process. Such items include:
- gaseous diffusion barriers,
  - gaseous diffuser housings,
  - gas centrifuge assemblies, corrosion-resistant to  $UF_6$ ,
  - Jet nozzle separation units,
  - vortex separation units,

- large UF<sub>6</sub> corrosion-resistant axial or centrifugal compressors,
- special compressor seals for such compressors.

## *Annex B*

### **Criteria for Levels of Physical Protection**

1. The purpose of physical protection of nuclear materials is to prevent unauthorized use and handling of these materials. Paragraph 3(a) of the Guidelines document calls for agreement among suppliers on the levels of protection to be ensured in relation to the type of materials, and equipment and facilities containing these materials, taking account of international recommendations.
2. Paragraph 3(b) of the Guidelines document states that implementation of measures of physical protection in the recipient country is the responsibility of the Government of that country. However, the levels of physical protection on which these measures have to be based should be the subject of an agreement between supplier and recipient. In this context these requirements should apply to all States.
3. The document INFCIRC/225 of the International Atomic Energy Agency entitled "The Physical Protection of Nuclear Material" and similar documents which from time to time are prepared by international groups of experts and updated as appropriate to account for changes in the state of the art and state of knowledge with regard to physical protection of nuclear material are a useful basis for guiding recipient States in designing a system of physical protection measures and procedures.
4. The categorization of nuclear material presented in the attached table or as it may be updated from time to time by mutual agreement of suppliers shall serve as the agreed basis for designating specific levels of physical protection in relation to the type of materials, and equipment and facilities containing these materials, pursuant to paragraph 3(a) and 3(b) of the Guidelines document.
5. The agreed levels of physical protection to be ensured by the competent national authorities in the use, storage and transportation of the materials listed in the attached table shall as a minimum include protection characteristics as follows:

#### **CATEGORY III**

*Use and Storage* within an area to which access is controlled.

*Transportation* under special precautions including prior arrangements among sender, recipient and carrier, and prior agreement between entities subject to the jurisdiction and regulation of supplier and recipient States, respectively, in case of international transport specifying time, place and procedures for transferring transport responsibility.

#### **CATEGORY II**

*Use and Storage* within a protected area to which access is controlled, i.e. an area under constant surveillance by guards or electronic devices, surrounded by a physical barrier with a limited number of points of entry under appropriate control, or any area with an equivalent level of physical protection.

*Transportation* under special precautions including prior arrangements among sender, recipient and carrier, and prior agreement between entities subject to the jurisdiction and regulation of supplier and recipient States, respectively, in case of international transport, specifying time, place and procedures for transferring transport responsibility

## CATEGORY I

Materials in this Category shall be protected with highly reliable systems against unauthorized use as follows:

*Use and Storage* within a highly protected area, i.e. a protected area as defined for Category II above, to which, in addition, access is restricted to persons whose trustworthiness has been determined, and which is under surveillance by guards; who are in close communication with appropriate response forces). Specific measures taken in this context should have as their objective the detection and prevention of any assault, unauthorized access or unauthorized removal of material.

*Transportation* under special precautions as identified above for transportation of Category II and III materials and, in addition, under constant surveillance by escorts and under conditions which assure close communication with appropriate response forces.

6. Suppliers should request identification by recipients of those agencies or authorities having responsibility for ensuring that levels of protection are adequately met and having responsibility for internally co-ordinating response/recovery operations in the event of unauthorized use or handling of protected materials. Suppliers and recipients should also designate points of contact within their national authorities to co-operate on matters of out-of-country transportation and other matters of mutual concern.

<b>TABLE: CATEGORIZATION OF NUCLEAR MATERIAL</b>				
<b>Material</b>	<b>Form</b>	<b>Category</b>		
		<b>I</b>	<b>II</b>	<b>III</b>
1. Plutonium <sup>[a]</sup>	Unirradiated <sup>[b]</sup>	2 kg or more	Less than 2 kg but more than 500 g	500 g or less <sup>[c]</sup>
2. Uranium-235	Unirradiated <sup>[b]</sup> <ul style="list-style-type: none"> <li>○ uranium enriched to 20% <sup>235</sup>U or more</li> <li>○ uranium enriched to 10% <sup>235</sup>U but less than 20%</li> <li>○ uranium enriched above natural, but less than 10% <sup>235</sup>U<sup>[d]</sup></li> </ul>	5 kg or more	Less than 5 kg but more than 1 kg	1 kg or less <sup>[c]</sup>
		-	10 kg or more	Less than 10 kg <sup>[c]</sup>
				10 kg or more
3. Uranium-233	Unirradiated <sup>[b]</sup>	2 kg or more	Less than 2 kg	500 g or less <sup>[c]</sup>

	more	but more than 500 g	
4. Irradiated fuel		Depleted or natural uranium, thorium or low-enriched fuel (less than 10% fissile content) <sup>[e]</sup> , <sup>[f]</sup>	

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<sup>[a]</sup> As identified in the Trigger List.

<sup>[b]</sup> Material not irradiated in a reactor or material irradiated in a reactor but with a radiation level equal to or less than 100 rads/hour at one metre unshielded.

<sup>[c]</sup> Less than a radiologically significant quantity should be exempted.

<sup>[d]</sup> Natural uranium, depleted uranium and thorium and quantities of uranium enriched to less than 10% not falling in Category III should be protected in accordance with prudent management practice.

<sup>[e]</sup> Although this level of protection is recommended, it would be open to States, upon evaluation of the specific circumstances, to assign a different category of physical protection.

<sup>[f]</sup> Other fuel which by virtue of its original fissile material content is classified as Category I or II before irradiation may be reduced one category level while the radiation level from the fuel exceeds 100 rads/hour at one metre unshielded.

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