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**Letter dated 16 April 2012 from the Permanent Representative of the United States of America to the United Nations addressed to the Secretary-General**

I have the honour to forward to you a list of chemical and biological items, materials, equipment, goods and technologies related to other weapons of mass destruction programmes (see annex). The annex provides an update of document S/2006/816. We anticipate referring to this document in discussions related to the Security Council's presidential statement (S/PRST/2012/13) of 16 April regarding the Democratic People's Republic of Korea.

I would be grateful if the annexed list could be circulated as a document of the Security Council.

*(Signed)* Susan E. Rice



**Annex to the letter dated 16 April 2012 from the Permanent Representative of the United States of America to the United Nations addressed to the Secretary-General**

**Chemical and biological items, materials, equipment, goods and technologies related to other weapons of mass destruction programmes**

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Definition of Terms

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- 'Development'
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- Genetic Elements and Genetically-modified Organisms

### Chemical weapon precursors

<b>Precursor Chemical</b>	<b>CAS No.</b>
Thiodiglycol	(111-48-8)
Phosphorus oxychloride	(10025-87-3)
Dimethyl methylphosphonate	(756-79-6)
Methylphosphonyl difluoride (DF)	(676-99-3)
Methylphosphonyl dichloride (DC)	(676-97-1)
Dimethyl phosphite (DMP)	(868-85-9)
Phosphorus trichloride	(7719-12-2)
Trimethyl phosphite (TMP)	(121-45-9)
Thionyl chloride	(7719-09-7)
3-Hydroxy-1-methylpiperidine	(3554-74-3)
N,N-Diisopropyl-(beta)-aminoethyl chloride	(96-79-7)
N,N-Diisopropyl-(beta)-aminoethane thiol	(5842-07-9)
3-Quinuclidinol	(1619-34-7)
Potassium fluoride	(7789-23-3)
2-Chloroethanol	(107-07-3)
Dimethylamine	(124-40-3)
Diethyl ethylphosphonate	(78-38-6)
Diethyl N,N-dimethylphosphoramidate	(2404-03-7)
Diethyl phosphite	(762-04-9)
Dimethylamine hydrochloride	(506-59-2)
Ethylphosphinyl dichloride	(1498-40-4)
Ethylphosphonyl dichloride	(1066-50-8)
Ethylphosphonyl difluoride	(753-98-0)
Hydrogen fluoride	(7664-39-3)
Methyl benzilate	(76-89-1)
Methylphosphinyl dichloride	(676-83-5)
N,N-Diisopropyl-(beta)-amino-ethanol	(96-80-0)
Pinacolyl alcohol	(464-07-3)
O-Ethyl 2-diisopropylaminoethyl methylphosphonite (QL)	(57856-11-8)
Triethyl phosphite	(122-52-1)
Arsenic trichloride	(7784-34-1)
Benzilic acid	(76-93-7)
Diethyl methylphosphonite	(15715-41-0)
Dimethyl ethylphosphonate	(6163-75-3)
Ethylphosphinyl difluoride	(430-78-4)
Methylphosphinyl difluoride	(753-59-3)
3-Quinuclidone	(3731-38-2)
Phosphorus pentachloride	(10026-13-8)
Pinacolone	(75-97-8)
Potassium cyanide	(151-50-8)
Potassium bifluoride	(7789-29-9)
Ammonium bifluoride	(1341-49-7)

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Sodium bifluoride	(1333-83-1)
Sodium fluoride	(7681-49-4)
Sodium cyanide	(143-33-9)
Triethanolamine	(102-71-6)
Phosphorus pentasulphide	(1314-80-3)
Diisopropylamine	(108-18-9)
Diethylaminoethanol	(100-37-8)
Sodium sulphide	(1313-82-2)
Sulphur monochloride	(10025-67-9)
Sulphur dichloride	(10545-99-0)
Triethanolamine hydrochloride	(637-39-8)
N,N-Diisopropyl-2-aminoethyl chloride hydrochloride	(4261-68-1)
Methylphosphonic acid	(993-13-5)
Diethyl methylphosphonate	(683-08-9)
N,N-Dimethylaminophosphoryl dichloride	(677-43-0)
Triisopropyl phosphite	(116-17-6)
Ethyldiethanolamine	(139-87-7)
O,O-Diethyl phosphorothioate	(2465-65-8)
O,O-Diethyl phosphorodithioate	(298-06-6)
Sodium hexafluorosilicate	(16893-85-9)
Methylphosphonothioic dichloride	(676-98-2)

Technical note - Chemicals are listed by name, Chemical Abstract Service (CAS) number and CWC Schedule (where applicable). Chemicals of the same structural formula (e.g., hydrates) are controlled regardless of name or CAS number. CAS numbers are shown to assist in identifying whether a particular chemical or mixture is controlled, irrespective of nomenclature. However, CAS numbers cannot be used as unique identifiers in all situations because some forms of the listed chemical have different CAS numbers, and mixtures containing a listed chemical may also have different CAS numbers.

## Dual-use chemical manufacturing facilities and equipment and related technology and software

### I. MANUFACTURING FACILITIES AND EQUIPMENT

**Note 1.** The objective of these controls should not be defeated by the transfer of any non-controlled item containing one or more controlled components where the controlled component or components are the principal element of the item and can feasibly be removed or used for other purposes.

**N.B.** In judging whether the controlled component or components are to be considered the principal element, governments should weigh the factors of quantity, value, and technological know-how involved and other special circumstances which might establish the controlled component or components as the principal element of the item being procured.

**Note 2.** The objective of these controls should not be defeated by the transfer of a whole plant, on any scale, which has been designed to produce any CW agent or CW precursor chemical.

**Note 3.** The materials used for gaskets, packing, seals, screws, washers or other materials performing a sealing function do not determine the status of control of the items listed below, provided that such components are designed to be interchangeable.

#### 1. Reaction Vessels, Reactors or Agitators

Reaction vessels or reactors, with or without agitators, with total internal (geometric) volume greater than 0.1 m<sup>3</sup> (100 l) and less than 20 m<sup>3</sup> (20000 l), where all surfaces that come in direct contact with the chemical(s) being processed or contained are made from the following materials:

- a. nickel or alloys with more than 40% nickel by weight;
- b. alloys with more than 25% nickel and 20% chromium by weight;
- c. fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight);
- d. glass or glass-lined (including vitrified or enamelled coating);
- e. tantalum or tantalum alloys;
- f. titanium or titanium alloys;
- g. zirconium or zirconium alloys; or
- h. niobium (columbium) or niobium alloys.

Agitators for use in the above-mentioned reaction vessels or reactors; and impellers, blades or shafts designed for such agitators, where all surfaces of the agitator or component that come in direct contact with the chemical(s) being processed or contained are made from the following materials:

- a. nickel or alloys with more than 40% nickel by weight;
- b. alloys with more than 25% nickel and 20% chromium by weight;

- c. fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight);
- d. glass or glass-lined (including vitrified or enamelled coating);
- e. tantalum or tantalum alloys;
- f. titanium or titanium alloys;
- g. zirconium or zirconium alloys; or
- h. niobium (columbium) or niobium alloys.

## 2. Storage Tanks, Containers or Receivers

Storage tanks, containers or receivers with a total internal (geometric) volume greater than 0.1 m<sup>3</sup> (100 l) where all surfaces that come in direct contact with the chemical(s) being processed or contained are made from the following materials:

- a. nickel or alloys with more than 40% nickel by weight;
- b. alloys with more than 25% nickel and 20% chromium by weight;
- c. fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight);
- d. glass or glass-lined (including vitrified or enamelled coating);
- e. tantalum or tantalum alloys;
- f. titanium or titanium alloys;
- g. zirconium or zirconium alloys; or
- h. niobium (columbium) or niobium alloys.

## 3. Heat Exchangers or Condensers

Heat exchangers or condensers with a heat transfer surface area of greater than 0.15 m<sup>2</sup>, and less than 20 m<sup>2</sup>; and tubes, plates, coils or blocks (cores) designed for such heat exchangers or condensers, where all surfaces that come in direct contact with the chemical(s) being processed are made from the following materials:

- a. nickel or alloys with more than 40% nickel by weight;
- b. alloys with more than 25% nickel and 20% chromium by weight;
- c. fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight);
- d. glass or glass-lined (including vitrified or enamelled coating);
- e. graphite or carbon-graphite;
- f. tantalum or tantalum alloys;
- g. titanium or titanium alloys;
- h. zirconium or zirconium alloys;
- i. silicon carbide;
- j. titanium carbide; or
- k. niobium (columbium) or niobium alloys.

Technical note: carbon-graphite is a composition consisting of amorphous carbon and graphite, in which the graphite content is eight percent or more by weight.

#### 4. Distillation or Absorption Columns

Distillation or absorption columns of internal diameter greater than 0.1 m; and liquid distributors, vapour distributors or liquid collectors designed for such distillation or absorption columns, where all surfaces that come in direct contact with the chemical(s) being processed are made from the following materials:

- a. nickel or alloys with more than 40% nickel by weight;
- b. alloys with more than 25% nickel and 20% chromium by weight;
- c. fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight);
- d. glass or glass-lined (including vitrified or enamelled coating);
- e. graphite or carbon-graphite;
- f. tantalum or tantalum alloys;
- g. titanium or titanium alloys;
- h. zirconium or zirconium alloys; or
- i. niobium (columbium) or niobium alloys.

Technical note: carbon-graphite is a composition consisting of amorphous carbon and graphite, in which the graphite content is eight percent or more by weight.

#### 5. Filling Equipment

Remotely operated filling equipment in which all surfaces that come in direct contact with the chemical(s) being processed are made from the following materials:

- a. nickel or alloys with more than 40% nickel by weight; or
- b. alloys with more than 25% nickel and 20% chromium by weight.

#### 6. Valves

Valves with nominal sizes greater than 1.0 cm (3/8") and casings (valve bodies) or preformed casing liners designed for such valves, in which all surfaces that come in direct contact with the chemical(s) being produced, processed, or contained are made from the following materials:

- a. nickel or alloys with more than 40% nickel by weight;
- b. alloys with more than 25% nickel and 20% chromium by weight;
- c. fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight);
- d. glass or glass-lined (including vitrified or enamelled coating);
- e. tantalum or tantalum alloys;
- f. titanium or titanium alloys;



- g. zirconium or zirconium alloys;
- h. niobium (columbium) or niobium alloys; or
- i. ceramic materials as follows:
  1. silicon carbide with a purity of 80% or more by weight;
  2. aluminum oxide (alumina) with a purity of 99.9% or more by weight;
  3. zirconium oxide (zirconia).

Technical note: The 'nominal size' is defined as the smaller of the inlet and outlet port diameters.

## 7. Multi-Walled Piping

Multi-walled piping incorporating a leak detection port, in which all surfaces that come in direct contact with the chemical(s) being processed or contained are made from the following materials:

- a. nickel or alloys with more than 40% nickel by weight;
- b. alloys with more than 25% nickel and 20% chromium by weight;
- c. fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight);
- d. glass or glass-lined (including vitrified or enamelled coating);
- e. graphite or carbon-graphite;
- f. tantalum or tantalum alloys;
- g. titanium or titanium alloys;
- h. zirconium or zirconium alloys; or
- i. niobium (columbium) or niobium alloys.

Technical note: carbon-graphite is a composition consisting of amorphous carbon and graphite, in which the graphite-content is eight percent or more by weight.

## 8. Pumps

Multiple-seal and seal-less pumps with manufacturer's specified maximum flow-rate greater than 0.6 m<sup>3</sup>/h, or vacuum pumps with manufacturer's specified maximum flow-rate greater than 5 m<sup>3</sup>/h (under standard temperature (273 K (0o C)) and pressure (101.3 kPa) conditions), and casings (pump bodies), preformed casing liners, impellers, rotors or jet pump nozzles designed for such pumps, in which all surfaces that come into direct contact with the chemical(s) being processed are made from any of the following materials:

- a. nickel or alloys with more than 40% nickel by weight;
- b. alloys with more than 25% nickel and 20% chromium by weight;
- c. fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight);
- d. glass or glass-lined (including vitrified or enamelled coating);
- e. graphite or carbon-graphite;
- f. tantalum or tantalum alloys;

- g. titanium or titanium alloys;
- h. zirconium or zirconium alloys;
- i. ceramics;
- j. ferrosilicon (high silicon iron alloys); or
- k. niobium (columbium) or niobium alloys.

Technical note: carbon-graphite is a composition consisting of amorphous carbon and graphite, in which the graphite content is eight percent or more by weight.

## 9. Incinerators

Incinerators designed to destroy CW agents, controlled precursors or chemical munitions, having specially designed waste supply systems, special handling facilities, and an average combustion chamber temperature greater than 1000o C, in which all surfaces in the waste supply system that come into direct contact with the waste products are made from or lined with the following materials:

- a. nickel or alloys with more than 40% nickel by weight;
- b. alloys with more than 25% nickel and 20% chromium by weight; or
- c. ceramics.

Technical note: For the listed materials in the above entries, the term 'alloy' when not accompanied by a specific elemental concentration is understood as identifying those alloys where the identified metal is present in a higher percentage by weight than any other element.

### **Statement of Understanding**

These controls do not apply to equipment which is specially designed for use in civil applications (for example food processing, pulp and paper processing, or water purification, etc) and is, by the nature of its design, inappropriate for use in storing, processing, producing or conducting and controlling the flow of chemical warfare agents or any of the CW precursor chemicals.

## **II. TOXIC GAS MONITORING SYSTEMS AND THEIR DEDICATED DETECTING COMPONENTS**

Toxic gas monitoring systems and their dedicated detecting components as follows: detectors; sensor devices; replaceable sensor cartridges; and dedicated software therefore

- a. designed for continuous operation and usable for the detection of chemical warfare agents or CW agent precursors at concentrations of less than 0.3 mg/m<sup>3</sup>; or
- b. designed for the detection of cholinesterase-inhibiting activity

### III. RELATED TECHNOLOGY

'Technology', including licenses, directly associated with -

- o CW agents;
- o CW agent precursors; or
- o CW dual-use equipment items,

to the extent permitted by national legislation.

This includes:

- o transfer of technology (technical data) by any means, including electronic media, fax or telephone
- o transfer of technology in the form of technical assistance.

Controls on 'technology' do not apply to information 'in the public domain' or to 'basic scientific research' or the minimum necessary information for patent application.

The approval for export of any CW item of dual-use equipment also authorises the export to the same end-user of the minimum 'technology' required for the installation, operation, maintenance or repair of that item.

### IV. SOFTWARE

Controls on 'software' transfer only apply where specifically indicated in sections I and II above, and do not apply to 'software' which is either:

1. Generally available to the public by being:
  - a. Sold from stock at retail selling points without restriction, by means of:
    - i. Over-the-counter transactions;
    - ii. Mail order transactions;
    - iii. Electronic transactions; or
    - iv. Telephone call transactions; and
  - b. Designed for installation by the user without further substantial support by the supplier; or
2. 'In the public domain'.

### **Definition of Terms**

#### **'Basic scientific research'**

Experimental or theoretical work undertaken principally to acquire new knowledge of the fundamental principles of phenomena or observable facts, not primarily directed towards a specific practical aim or objective.

#### **'Development'**

'Development' is related to all phases before 'production' such as:

- design
- design research
- design analysis
- design concepts
- assembly of prototypes
- pilot production schemes
- design data
- process or transforming design data into a product
- configuration design
- integration design
- layouts

#### **'Export'**

An actual shipment or transmission of CW items out of the country. This includes transmission of technology by electronic media, fax or telephone.

#### **'in the public domain'**

'In the public domain', as it applies herein, means technology that has been made available without restrictions upon its further dissemination. (Copyright restrictions do not remove technology from being in the public domain).

#### **'Microprogramme'**

A sequence of elementary instructions maintained in a special storage, the execution of which is initiated by the introduction of its reference instruction register.

#### **'Production'**

Production means all production phases such as:

- construction
- production engineering

- manufacture
- integration
- assembly (mounting)
- inspection
- testing
- quality assurance

### 'Programme'

A sequence of instructions to carry out a process in, or convertible into, a form executable by an electronic computer.

### 'Software'

A collection of one or more 'programmes' or 'microprogrammes' fixed in any tangible medium of expression.

### 'Technology'

Specific information necessary for the 'development', 'production' or 'use' of a product. The information takes the form of 'technical data' or 'technical assistance'.

### 'Technical assistance'

May take forms, such as: instruction, skills, training, working knowledge, consulting services. Technical assistance includes oral forms of assistance. Technical assistance may involve transfer of 'technical data'.

### 'Technical data'

May take forms such as blueprints, plans, diagrams, models, formulae, tables, engineering designs and specifications, manuals and instructions written or recorded on other media or devices such as disk, tape, read-only memories.

### 'Use'

Operation, installation (including on-site installation), maintenance (checking), repair, overhaul or refurbishing.

## **Dual-use biological equipment and related technology and software**

### **I. EQUIPMENT**

#### **1. Complete containment facilities at P3 or P4 containment level**

Complete containment facilities that meet the criteria for P3 or P4 (BL3, BL4, L3, L4) containment as specified in the WHO Laboratory Biosafety Manual (3rd edition, Geneva, 2004) should be subject to export control.

#### **2. Fermenters**

Fermenters capable of cultivation of pathogenic micro-organisms, viruses or for toxin production, without the propagation of aerosols, having a capacity of 20 litres or greater. Fermenters include bioreactors, chemostats and continuous-flow systems.

#### **3. Centrifugal Separators**

Centrifugal separators capable of the continuous separation of pathogenic micro-organisms, without the propagation of aerosols, and having all the following characteristics:

- a. one or more sealing joints within the steam containment area;
- b. a flow rate greater than 100 litres per hour;
- c. components of polished stainless steel or titanium;
- d. capable of in-situ steam sterilisation in a closed state.

Technical note: Centrifugal separators include decanters.

#### **4. Cross (tangential) Flow Filtration Equipment**

Cross (tangential) flow filtration equipment capable of separation of pathogenic micro-organisms, viruses, toxins or cell cultures having all the following characteristics:

- a. a total filtration area equal to or greater than 1 square metre; and
- b. having any of the following characteristics:
  - i. capable of being sterilized or disinfected in-situ; or
  - ii. using disposable or single-use filtration components.

(N.B. This control excludes reverse osmosis equipment, as specified by the manufacturer.)

Cross (tangential) flow filtration components (eg modules, elements, cassettes, cartridges, units or plates) with filtration area equal to or greater than 0.2 square metres for each component and designed for use in cross (tangential) flow filtration equipment as specified above.

Technical note: In this control, 'sterilized' denotes the elimination of all viable microbes from the equipment through the use of either physical (eg steam) or chemical agents. 'Disinfected' denotes the destruction of potential microbial infectivity in the equipment through the use of chemical agents with a germicidal effect. 'Disinfection' and 'sterilization' are distinct from 'sanitization', the latter referring to cleaning procedures designed to lower the microbial content of equipment without necessarily achieving elimination of all microbial infectivity or viability.

#### 5. Freeze-drying Equipment

Steam sterilisable freeze-drying equipment with a condenser capacity of 10 kgs of ice or greater in 24 hours and less than 1000 kgs of ice in 24 hours.

#### 6. Protective and containment equipment as follows:

- a. protective full or half suits, or hoods dependent upon a tethered external air supply and operating under positive pressure;

Technical note: This does not control suits designed to be worn with self-contained breathing apparatus.

- b. class III biological safety cabinets or isolators with similar performance standards (e.g. flexible isolators, dry boxes, anaerobic chambers, glove boxes, or laminar flow hoods (closed with vertical flow)).

#### 7. Aerosol inhalation chambers

Chambers designed for aerosol challenge testing with micro-organisms, viruses or toxins and having a capacity of 1 cubic metre or greater.

#### 8. Spraying or fogging systems and components therefore, as follows:

- a. Complete spraying or fogging systems, specially designed or modified for fitting to aircraft, lighter than air vehicles or UAVs, capable of delivering, from a liquid suspension, an initial droplet "VMD" of less than 50 microns at a flow rate of greater than two litres per minute.
- b. Spray booms or arrays of aerosol generating units, specially designed or modified for fitting to aircraft, lighter than air vehicles or UAVs, capable of delivering, from a liquid suspension, an initial droplet "VMD" of less than 50 microns at a flow rate of greater than two litres per minute.
- c. Aerosol generating units specially designed for fitting to systems that fulfil all the criteria specified in paragraphs 8.a and 8.b.

## Technical Notes

Aerosol generating units are devices specially designed or modified for fitting to aircraft such as nozzles, rotary drum atomisers and similar devices.

This entry does not control spraying or fogging systems and components as specified in paragraph 8 above that are demonstrated not to be capable of delivering biological agents in the form of infectious aerosols.

Pending definition of international standards, the following guidelines should be followed:

Droplet size for spray equipment or nozzles specially designed for use on aircraft or UAVs should be measured using either of the following methods:

- a. Doppler laser method
  - b. Forward laser diffraction method
9. Spray drying equipment capable of drying toxins or pathogenic microorganisms having all of the following characteristics:
1. a water evaporation capacity of  $\geq 0.4$  kg/h and  $\leq 400$  kg/h;
  2. the ability to generate a typical mean product particle size of  $\leq 10$  micrometers with existing fittings or by minimal modification of the spray-dryer with atomization nozzles enabling generation of the required particle size; and
  3. capable of being sterilized or disinfected in situ."

## Items for inclusion in Awareness Raising Guidelines

Experts propose that the following items be included in awareness raising guidelines to industry:

1. Equipment for the micro-encapsulation of live micro-organisms and toxins in the range of 1-10  $\mu\text{m}$  particle size, specifically:
  - a. interfacial polycondensators;
  - b. phase separators.
2. Fermenters of less than 20 litre capacity with special emphasis on aggregate orders or designs for use in combined systems.
3. Conventional or turbulent air-flow clean-air rooms and self-contained fan-HEPA filter units that may be used for P3 or P4 (BL3, BL4, L3, L4) containment facilities.



## II. RELATED TECHNOLOGY

Technology, including licenses, directly associated with

- Controlled biological agents; or
- Controlled dual-use biological equipment items

to the extent permitted by national legislation.

This includes

- a) transfer of technology (technical data) by any means, including electronic media, fax or telephone
- b) transfer of technology in the form of technical assistance.

Controls on 'technology' do not apply to information 'in the public domain' or to 'basic scientific research' or the minimum necessary information for patent application.

The approval for export of any controlled item of dual-use equipment also authorises the export to the same end-user of the minimum 'technology' required for the installation, operation, maintenance, or repair of that item.

## III. SOFTWARE

Controls on 'software' transfer only apply where specifically indicated in sections I and II above, and do not apply to 'software' which is either:

1. Generally available to the public by being:
  - a. Sold from stock at retail selling points without restriction, by means of:
    - i. Over-the-counter transactions;
    - ii. Mail order transactions;
    - iii. Electronic transactions; or
    - iv. Telephone call transactions; and
  - b. Designed for installation by the user without further substantial support by the supplier; or
2. 'In the public domain'.

### **Definition of Terms**

'Basic scientific research'

Experimental or theoretical work undertaken principally to acquire new knowledge of the fundamental principles of phenomena or observable facts, not primarily directed towards a specific practical aim or objective.

'Development'

'Development' is related to all stages before production such as:

- assembly of prototypes,
- configuration design,
- design,
- design analysis,
- design concepts,
- design data,
- design research,
- integration design,
- layouts,
- pilot production schemes, and
- process or transforming design data into a product.

'Export'

An actual shipment or transmission of controlled items out of the country. This includes transmission of technology by electronic media, fax or telephone.

'In the public domain'

'In the public domain', as it applies herein, means technology that has been made available without restrictions upon its further dissemination. (Copyright restrictions do not remove technology from being in the public domain.)

'Lighter than air vehicles'

Balloons and airships that rely on hot air or on lighter-than-air gases such as helium or hydrogen for their lift.

'Microprogramme'

A sequence of elementary instructions maintained in a special storage, the execution of which is initiated by the introduction of its reference instruction register.

'Production'

Production means all production phases such as:

- construction,
- production engineering,
- manufacture,
- integration,

- assembly (mounting),
- inspection,
- testing, and
- quality assurance.

#### 'Programme'

A sequence of instructions to carry out a process in, or convertible into, a form executable by an electronic computer.

#### 'Software'

A collection of one or more 'programmes' or 'microprogrammes' fixed in any tangible medium of expression.

#### 'Technical assistance'

May take forms, such as: instruction, skills, training, working knowledge, consulting services. Technical assistance includes oral forms of assistance. Technical assistance may involve transfer of 'technical data'.

#### 'Technical data'

May take forms such as blueprints, plans, diagrams, models, formulae, tables, engineering designs and specifications, manuals and instructions written or recorded on other media or devices such as disk, tape, read-only memories.

#### 'Technology'

Specific information necessary for the 'development', 'production', or 'use' of a product. The information takes the form of 'technical data' or 'technical assistance'.

#### 'UAVs'

Unmanned Aerial Vehicles.

#### 'Use'

Operation, installation, (including on-site installation), maintenance, (checking), repair, overhaul or refurbishing.

#### 'VMD'

Volume Median Diameter (*note: for water-based systems, VMD equates to MMD – the Mass Median Diameter*).

## Biological agents

### Viruses

1. Andes virus
2. Chapare virus
3. Chikungunya virus
4. Choclo virus
5. Congo-Crimean haemorrhagic fever virus
6. Dengue fever virus
7. Dobrava-Belgrade virus
8. Eastern equine encephalitis virus
9. Ebola virus
10. Guanarito virus
11. Hantaan virus
12. Hendra virus (Equine morbillivirus)
13. Japanese encephalitis virus
14. Junin virus
15. Kyasanur Forest virus
16. Laguna Negra virus
17. Lassa fever virus
18. Louping ill virus
19. Lujo virus
20. Lymphocytic choriomeningitis virus
21. Machupo virus
22. Marburg virus
23. Monkey pox virus
24. Murray Valley encephalitis virus
25. Nipah virus
26. Omsk haemorrhagic fever virus
27. Oropouche virus
28. Powassan virus
29. Rift Valley fever virus
30. Rocio virus
31. Sabia virus
32. Seoul virus
33. Sin nombre virus
34. St Louis encephalitis virus
35. Tick-borne encephalitis virus (Russian Spring-Summer encephalitis virus)
36. Variola virus
37. Venezuelan equine encephalitis virus
38. Western equine encephalitis virus
39. Yellow fever virus

**Bacteria**

1. Bacillus anthracis
2. Brucella abortus
3. Brucella melitensis
4. Brucella suis
5. Chlamydophila psittaci (formerly known as Chlamydia psittaci)
6. Clostridium botulinum
7. Francisella tularensis
8. Burkholderia mallei (Pseudomonas mallei)
9. Burkholderia pseudomallei (Pseudomonas pseudomallei)
10. Salmonella typhi
11. Shigella dysenteriae
12. Vibrio cholerae
13. Yersinia pestis
14. Clostridium perfringens, epsilon toxin producing types<sup>[2]</sup>
15. Enterohaemorrhagic Escherichia coli, serotype O157 and other verotoxin producing serotypes
16. Coxiella burnetii
17. Rickettsia prowazekii

**Toxins as follow and subunits thereof:**<sup>[3]</sup>

1. Botulinum toxins<sup>[4]</sup>
2. Clostridium perfringens toxins
3. Conotoxin<sup>[4]</sup>
4. Ricin
5. Saxitoxin
6. Shiga toxin
7. Staphylococcus aureus toxins
8. Tetrodotoxin
9. Verotoxin and shiga-like ribosome inactivating proteins
10. Microcystin (Cyanginosin)
11. Aflatoxins
12. Abrin
13. Cholera toxin
14. Diacetoxyscirpenol toxin
15. T-2 toxin
16. HT-2 toxin
17. Modeccin toxin
18. Volkensin toxin
19. Viscum Album Lectin 1 (Viscumin)

## **Fungi**

1. *Coccidioides immitis*
2. *Coccidioides posadasii*

<sup>[1]</sup> Biological agents are controlled when they are an isolated live culture of a pathogen agent, or a preparation of a toxin agent which has been isolated or extracted from any source, or material including living material which has been deliberately inoculated or contaminated with the agent. Isolated live cultures of a pathogen agent include live cultures in dormant form or in dried preparations, whether the agent is natural, enhanced or modified.

An agent is covered by this list except when it is in the form of a vaccine. A vaccine is a medicinal product in a pharmaceutical formulation licensed by, or having marketing or clinical trial authorisation from, the regulatory authorities of either the country of manufacture or of use, which is intended to stimulate a protective immunological response in humans or animals in order to prevent disease in those to whom or to which it is administered.

<sup>[2]</sup> It is understood that limiting this control to epsilon toxin-producing strains of *Clostridium perfringens* therefore exempts from control the transfer of other *Clostridium perfringens* strains to be used as positive control cultures for food testing and quality control.

<sup>[3]</sup> Excluding immunotoxins.

<sup>[4]</sup> Excluding botulinum toxins and conotoxins in product form meeting all of the following criteria:

- are pharmaceutical formulations designed for testing and human administration in the treatment of medical conditions;
- are pre-packaged for distribution as clinical or medical products; and
- are authorised by a state authority to be marketed as clinical or medical products.

## **Genetic Elements and Genetically-modified Organisms:**

1. Genetic elements that contain nucleic acid sequences associated with the pathogenicity of any of the microorganisms in the list.
2. Genetic elements that contain nucleic acid sequences coding for any of the toxins in the list, or for their sub-units.
3. Genetically-modified organisms that contain nucleic acid sequences associated with the pathogenicity of any of the microorganisms in the list.
4. Genetically-modified organisms that contain nucleic acid sequences coding for any of the toxins in the list or for their sub-units.

**Technical note:**

Genetically-modified organisms includes organisms in which the genetic material (nucleic acid sequences) has been altered in a way that does not occur naturally by mating and/or natural recombination, and encompasses those produced artificially in whole or in part.

Genetic elements include inter alia chromosomes, genomes, plasmids, transposons, and vectors whether genetically modified or unmodified, or chemically synthesized in whole or in part.

Nucleic acid sequences associated with the pathogenicity of any of the micro-organisms in the list means any sequence specific to the relevant listed micro-organism:

- that in itself or through its transcribed or translated products represents a significant hazard to human, animal or plant health; or
- that is known to enhance the ability of a listed micro-organism, or any other organism into which it may be inserted or otherwise integrated, to cause serious harm to human, animal or plant health.

These controls do not apply to nucleic acid sequences associated with the pathogenicity of enterohaemorrhagic *Escherichia coli*, serotype O157 and other verotoxin producing strains, other than those coding for the verotoxin, or for its sub-units.

**WARNING LIST<sup>[1]</sup>****Bacteria**

1. *Clostridium tetani*\*
2. *Legionella pneumophila*
3. *Yersinia pseudotuberculosis*

\* Australia Group recognises that this organism is ubiquitous, but, as it has been acquired in the past as part of biological warfare programs, it is worthy of special caution.

**Fungi**

1. *Fusarium sporotrichioides*
2. *Fusarium langsethiae*

<sup>[1]</sup> Biological agents are controlled when they are an isolated live culture of a pathogen agent, or a preparation of a toxin agent which has been isolated or extracted from any source, or material including living material which has been deliberately inoculated or contaminated with the agent. Isolated live cultures of a pathogen agent include live cultures in dormant form or in dried preparations, whether the agent is natural, enhanced or modified.

An agent is covered by this list except when it is in the form of a vaccine. A vaccine is a medicinal product in a pharmaceutical formulation licensed by, or having marketing or clinical trial authorisation from, the regulatory authorities of either the country of manufacture or of use, which is intended to stimulate a protective immunological response in humans or animals in order to prevent disease in those to whom or to which it is administered.

**Genetic Elements and Genetically-modified Organisms:**

1. Genetic elements that contain nucleic acid sequences associated with the pathogenicity of any of the microorganisms in the list.
2. Genetic elements that contain nucleic acid sequences coding for any of the toxins in the list, or for their sub-units.
3. Genetically-modified organisms that contain nucleic acid sequences associated with the pathogenicity of any of the microorganisms in the list.
4. Genetically-modified organisms that contain nucleic acid sequences coding for any of the toxins in the list or for their sub-units.

**Technical note:**

Genetically-modified organisms includes organisms in which the genetic material (nucleic acid sequences) has been altered in a way that does not occur naturally by mating and/or natural recombination, and encompasses those produced artificially in whole or in part.

Genetic elements include inter alia chromosomes, genomes, plasmids, transposons, and vectors whether genetically modified or unmodified, or chemically synthesized in whole or in part.

Nucleic acid sequences associated with the pathogenicity of any of the micro-organisms in the list means any sequence specific to the relevant listed micro-organism:

- that in itself or through its transcribed or translated products represents a significant hazard to human, animal or plant health; or

that is known to enhance the ability of a listed micro-organism, or any other organism into which it may be inserted or otherwise integrated, to cause serious harm to human, animal or plant health.



## Plant pathogens

### Bacteria

1. *Xanthomonas albilineans*
2. *Xanthomonas campestris* pv. *citri*
3. *Xanthomonas oryzae* pv. *oryzae* (*Pseudomonas campestris* pv. *oryzae*)
4. *Clavibacter michiganensis* subsp. *sepedonicus* (*Corynebacterium michiganensis* subsp. *sepedonicum* or *Corynebacterium sepedonicum*)
5. *Ralstonia solanacearum* races 2 and 3 (*Pseudomonas solanacearum* races 2 and 3 or *Burkholderia solanacearum* races 2 and 3)

### Fungi

1. *Colletotrichum coffeanum* var. *virulans* (*Colletotrichum kahawae*)
2. *Cochliobolus miyabeanus* (*Helminthosporium oryzae*)
3. *Microcyclus ulei* (syn. *Dothidella ulei*)
4. *Puccinia graminis* (syn. *Puccinia graminis* f. sp. *tritici*)
5. *Puccinia striiformis* (syn. *Puccinia glumarum*)
6. *Pyricularia grisea* / *Pyricularia oryzae*

### Viruses

1. Potato Andean latent tymovirus
2. Potato spindle tuber viroid

### Genetic Elements and Genetically-modified Organisms:

1. Genetic elements that contain nucleic acid sequences associated with the pathogenicity of any of the microorganisms in the Core List.
2. Genetically-modified organisms that contain nucleic acid sequences associated with the pathogenicity of any of the microorganisms in the Core List.

**Technical note:** Genetically-modified organisms includes organisms in which the genetic material (nucleic acid sequences) has been altered in a way that does not occur naturally by mating and/or natural recombination, and encompasses those produced artificially in whole or in part.

Genetic elements include inter alia chromosomes, genomes, plasmids, transposons, and vectors whether genetically modified or unmodified, or chemically synthesized in whole or in part.

Nucleic acid sequences associated with the pathogenicity of any of the micro-organisms in the list means any sequence specific to the relevant listed micro-organism:

- that in itself or through its transcribed or translated products represents a significant hazard to human, animal or plant health; or
- that is known to enhance the ability of a listed micro-organism, or any other organism into which it may be inserted or otherwise integrated, to cause serious harm to human, animal or plant health.

### **Items for Inclusion in Awareness-raising Guidelines**

#### **Bacteria**

1. *Xylella fastidiosa*

#### **Fungi**

1. *Deuterophoma tracheiphila* (syn. *Phoma tracheiphila*)
2. *Monilia rorei* (syn. *Moniliophthora rorei*)

#### **Viruses**

1. Banana bunchy top virus

#### **Genetic Elements and Genetically-modified Organisms:**

1. Genetic elements that contain nucleic acid sequences associated with the pathogenicity of any of the microorganisms in the Awareness-raising Guidelines.
2. Genetically-modified organisms that contain nucleic acid sequences associated with the pathogenicity of any of the microorganisms in the Awareness-raising Guidelines.

**Technical note:** Genetically-modified organisms includes organisms in which the genetic material (nucleic acid sequences) has been altered in a way that does not occur naturally by mating and/or natural recombination, and encompasses those produced artificially in whole or in part.

Genetic elements include inter alia chromosomes, genomes, plasmids, transposons, and vectors whether genetically modified or unmodified, or chemically synthesized in whole or in part.

Nucleic acid sequences associated with the pathogenicity of any of the micro-organisms in the list means any sequence specific to the relevant listed micro-organism:

- that in itself or through its transcribed or translated products represents a significant hazard to human, animal or plant health; or
- that is known to enhance the ability of a listed micro-organism, or any other organism into which it may be inserted or otherwise integrated, to cause serious harm to human, animal or plant health.

## Animal pathogens

### **Viruses**

1. African swine fever virus
2. Avian influenza virus<sup>[2]</sup>
3. Bluetongue virus
4. Foot and mouth disease virus
5. Goat pox virus
6. Herpes virus (Aujeszky's disease)
7. Hog cholera virus (synonym: swine fever virus)
8. Lyssa virus
9. Newcastle disease virus
10. Peste des petits ruminants virus
11. Porcine enterovirus type 9 (synonym: swine vesicular disease virus)
12. Rinderpest virus
13. Sheep pox virus
14. Teschen disease virus
15. Vesicular stomatitis virus
16. Lumpy skin disease virus
17. African horse sickness virus

<sup>[1]</sup> Except where the agent is in the form of a vaccine.

<sup>[2]</sup> This includes only those Avian influenza viruses of high pathogenicity as defined by competent international authorities or regulatory bodies such as the World Organization for Animal Health (OIE) or the European Union (EU).

### **Bacteria**

1. *Mycoplasma mycoides* subspecies *mycoides* SC (small colony)
2. *Mycoplasma capricolum* subspecies *capripneumoniae* ("strain F38")

### **Genetic Elements and Genetically-modified Organisms**

1. AG1 Genetic elements that contain nucleic acid sequences associated with the pathogenicity of any of the microorganisms in the list.
2. AG2 Genetically-modified organisms that contain nucleic acid sequences associated with the pathogenicity of any of the microorganisms in the list.

**Technical note:** Genetically-modified organisms includes organisms in which the genetic material (nucleic acid sequences) has been altered in a way that does not occur naturally by mating and/or natural recombination, and encompasses those produced artificially in whole or in part.

Genetic elements include inter alia chromosomes, genomes, plasmids, transposons, and vectors whether genetically modified or unmodified, or chemically synthesized in whole or in part.

Nucleic acid sequences associated with the pathogenicity of any of the micro-organisms in the list means any sequence specific to the relevant listed micro-organism:

- that in itself or through its transcribed or translated products represents a significant hazard to human, animal or plant health; or
  - that is known to enhance the ability of a listed micro-organism, or any other organism into which it may be inserted or otherwise integrated, to cause serious harm to human, animal or plant health
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