

National Regulation and Security of Dual-Use and Hazardous Materials

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ABSTRACT

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This paper will outline current and emerging national security-related controls on dual-use and hazardous materials, from both non-proliferation and counter-terrorism perspectives. Much of this is highly relevant to universities even though they may have poor visibility of the issues. Safety officers have the access and expertise to help universities meet their legislated security-related as well as safety obligations. Documentation and controlled goods identification tools will be provided to assist Safety officers with this work.

INTRODUCTION

This paper will outline current and emerging national security-related controls on dual-use and hazardous materials, and associated technologies, from both non-proliferation and counter-terrorism perspectives. These will be discussed in the context of the academic sector and the role of university safety officers.

These goods and technologies present a problem to effectively control because as well as providing the potential basis for weapons of mass destruction (WMD) capabilities, they often have necessary civil uses. For present purposes, WMD will be considered to include chemical, biological and nuclear weapons.

WMD IMPERATIVES

The Threat

The WMD threat is a real and growing one. Several states are covertly developing WMD in contravention of multilateral treaties. North Korea's nuclear program is a case in point. The fact that WMD programs are being pursued by countries in regions of instability – North East Asia, South Asia and the Middle East – is particularly worrying.

Alarmingly, international terrorist groups have also indicated their interest in acquiring – and using – WMD. Within Australia, the distinct possibility of a terrorist-style use of WMD has been recognized by the Australian Security Intelligence Organisation (ASIO) and other agencies. These may not be

traditional style weapons that could be expected from State programs, but more likely improvised devices that contain toxic industrial or other hazardous chemicals, harmful biological organisms or toxins, or radioactive material. Although still not a likely event, the possible consequences are so great that the Government and other groups have been undertaking considerable preventive and incident response work.

The most obvious example of such a terrorist attack was the use of sarin, a nerve agent, by the Aum sect in the Tokyo underground in 1995. However, before that incident, the sect had bought a property in Western Australia and were believed to have attempted to progress their WMD ambitions there without success.

International Obligations

The global proliferation of WMD capabilities during the latter half of the 20th century, has resulted in the emergence of a number of international WMD control regimes. The proliferation had been driven by the cold war and a number of regional "hot spots", particularly in the Middle East and in Asia. The resulting regimes addressed each type of WMD threat both in terms of multilateral agreements and voluntary export control arrangements by supplier countries.

The main multilateral agreements are the:

- Nuclear Non-Proliferation Treaty (NPT);
- Chemical Weapons Convention (CWC);
- Biological Weapons Convention (BWC); and
- Comprehensive Test Ban Treaty (CTBT).

Only the first two of these are fully operational worldwide and have the necessary preventative and verification provisions within them. These provisions relate to prohibiting certain activities such as weapons development and use, controlling dual-use activities, and reporting on these to, and allowing facility inspections, by certain UN agencies. The regimes both attempt to prevent proliferation and ensure member countries demonstrate Convention compliance.

Major export control arrangements include the:

- Australia Group - dual-use chemicals, biological agents and related manufacturing equipment - www.australiagroup.net;
- Nuclear Suppliers Group and Zangger Committee – nuclear and related dual-use items and technology - www.nuclearsuppliersgroup.org, www.zanggercommittee.org;
- Missile Technology Control Regime – missile delivery systems and related technology - www.mtcr.info; and
- Wassenaar Arrangement – conventional weapons and sensitive dual-use items and technologies - www.wassenaar.org.

The work of these groups complements that of the multilateral agreements, with an emphasis on preventing dual-use goods reaching countries which may misuse them.

More recent relevant initiatives have been the UN Security Resolution 1540, which commits states to criminalising proliferation to terrorist groups, including through adoption of effective export controls, and the Proliferation Security Initiative (PSI), which provides a practical tool for disrupting illicit trafficking in WMD-related goods and technologies through cooperative action on interdiction.

Australia is an active and prominent participant in all these WMD control regimes. In most cases, this entails firm legal and/or political commitments.

The Legislation

As a State Party to both the CWC and NPT, Australia has been required to enact corresponding dedicated legislation, namely *Chemical Weapons (Prohibition) Act 1994* and *Nuclear Non-Proliferation (Safeguards) Act 1987*. In addition, to better meet our other WMD obligations, it has been necessary for Australia to introduce more general legislation such as the *WMD Act 1995* and *Crimes (Biological Weapons) Act 1976*, or to modify existing legislation such as the *Customs Act 1901*, to regulate export/import of relevant goods. This legislation is at the national level, and it directs the work of several Commonwealth agencies.

There are of course numerous further pieces of Commonwealth and State/Territory legislation that relate to hazardous materials, but these primarily are concerned with consumer, worker, public and environmental safety, and only incidentally to security. Also, neither these nor the WMD-related legislation were designed to address terrorism risks, which will be discussed later in the paper.

REAL REQUIREMENTS

The real consequences of the legislation that arises from WMD threat and international obligations, are in terms of imposing controls by responsible authorities, often through issuing Permits for relevant facilities and activities, requiring reporting to those authorities, and in some cases making national declarations to UN agencies, and allowing those UN agencies to confirm declarations through managed on-site inspections.

These WMD controls are most developed in terms of domestic activities associated with certain chemicals and nuclear materials, and in regard to these and other dual-use goods where export controls are concerned. The overall impact on industry and academia is not great and controls are designed to be of minimal administrative burden, be at no direct cost to those regulated and not result in delays.

REGULATORS AND ROLES

Australia Safeguards and Non-Proliferation Office

The Australian Safeguards and Non-Proliferation Office (ASNO), located within the Foreign Affairs portfolio, has legislative responsibility for: the application of nuclear safeguards within Australia; security of nuclear materials and associated

items; operation of Australia's bilateral safeguards agreements; and ensuring that Australia meets nuclear non-proliferation treaty commitments. ASNO is responsible, also, for implementation of obligations arising from the CTBT (Comprehensive Test Ban Treaty). Further, it is involved in the development of verification arrangements for the BWC (Biological Weapons Convention) (www.dfat.gov.au/security/biological_weapons.html). Finally, it is responsible for the implementation of the CWC (Chemical Weapons Convention).

As Australia's CWC National Authority, ASNO is responsible for controlling and facilitating international verification of domestic activities associated with three Schedules of chemicals and certain major chemical production facilities. The Schedules are risk based, with the highest level of control imposed on Schedule 1 agents, which tend to be actual CW agents like sarin, and reduced control over Schedules 2 and 3 which involve agent precursors with legitimate uses. Regulation of production, import, export (Defence controlled) and in some cases use and consumption are most important. Table 1 details the facility Permit types associated with the three Schedules of chemicals. In addition, over 40 chemical importers hold Permits and more than 50 general chemical producers are registered with ASNO. To date, ASNO has managed 16 routine chemical facility inspections by the Organisation for the Prohibition of Chemical Weapons (OPCW).

Facility	Schedule 1	Schedule 2	Schedule 3
Type	Research facilities	Processing facilities	Production facilities
Number	9	12	3

Table 1 - Permits for CWC Scheduled chemical facilities, 30 June 2004

ASNO's other main domestic regulatory work is operating a Permit system for activities involving nuclear materials (uranium, plutonium, thorium) or associated items. As shown in Table 2 there were over 100 of these Permits extant in June 2004, and much the same situation exists today. Only a few of these facilities would be visited routinely by the International Atomic Energy Agency (IAEA). The bulk of the IAEA's inspections are at the Lucas Heights Science and Technology Centre in Sydney. As well as the domestic work, ASNO verifies that Australia's exported uranium is safeguarded and accounted for in recipient countries.

Permit or Authority to:	End of Period	Granted	Varied
Possess nuclear material	51	17	3
Possess associated items	21	0	0
Transport nuclear material	17	0	0
Establish a facility	1	1	0
Communicate information contained in associated technology	17	0	0
Total	107	18	3

Table 2 Status of safeguards permits and authorities in Australia, 30 June 2004

Amongst ASNO Permit holders are a number of universities, who undertake CWC Schedule 1 chemical production, most notably saxitoxin, in small research-related quantities or who hold small amounts of nuclear material. Only the latter are ever subject to international inspections.

ASNO undertakes extensive CWC and NPT outreach activities to industry and academia to raise awareness, to educate and to assist these sectors in meeting their associated obligations. This work also at times targets other relevant regulators and ASNO regularly shares its experiences with the Governments of regional countries.

Defence Trade Control and Compliance

Defence Trade Control and Compliance (DTCC) administers the controls on export for those items, which are controlled, by *Customs (Prohibited Exports) Regulations 13e*, under the *Customs Act (1901)*. This includes military and dual use equipment, nuclear material, chemicals, micro-organisms, toxins, electronics, software and technology, which are identified in a schedule of the regulations known as the Defence and Strategic Goods List (DSGL). The legislation also includes enforcement provisions with adequate sanctions to deter non-compliance.

In addition, the *Weapons of Mass Destruction (Prevention of Proliferation) Act 1995* enables Australia to control the export of any goods, services and technologies, both tangible and intangible, that may assist in the development or delivery of weapons of mass destruction. This catch-all legislation is now part of export control arrangements in an increasing number of countries.

Australia's Control List - The DSGL is a consolidated listing of a wide range of defence and dual-use goods and technologies that have been developed through the various international export control regimes and non-proliferation treaties and conventions, to which Australia is a member. The DSGL is regularly updated to ensure that it reflects advancements in technology.

Export Controls - Export controls are administered through a comprehensive licensing system, which is intended to prevent the inadvertent supply of controlled goods, whilst at the same time avoiding unnecessary hindrances to trade for peaceful purposes.

All applications to export controlled goods are assessed on a case-by-case basis. Applications deemed sensitive may be referred to an interdepartmental committee for consideration. This committee is known as the Standing Inter-Departmental Committee on Defence Exports (SIDCDE) with representatives from various Australian Government agencies including the departments of Foreign Affairs and Trade, Prime Minister and Cabinet, Attorney General's, Customs, Defence and Austrade. Effective co-operation between government departments, industry and academia is vital if export controls are to be effectively implemented and enforced.

Outreach Program –DTCC has developed a strategy for raising awareness of the export controls within industry, academia and often other regulators – this is commonly referred to as "Outreach". The Defence Outreach Program has evolved into a comprehensive and wide-scale program including;

- Educating exporters on the controls and the important contribution export controls make to global security;
- Development and on-going dialogue between DTCC and exporters so exporters report suspicious incidents and approaches from overseas entities and within Australia; and
- Raising awareness of the methods employed by proliferant states and terrorist groups to obtain controlled goods.

DTCC seeks to build strong relationships with exporters to ensure Australia does not inadvertently export goods, which may be used by terrorists or in weapons of mass destruction programs, and therefore undermine global security.

Australian Customs Service (Customs)

Customs is the primary agency for controlling trade and the movement of goods in and out of Australia. The Australian Government makes considerable use of its Customs systems to control, track and report on trade in CWC Scheduled chemicals, and to control export of goods as outlined in the section on DTCC. Customs works closely with ASNO and DTCC in these regards.

Coordination and Policy Guidance

The International Security Division of the Department of Foreign Affairs and Trade (DFAT) coordinates Australia's participation in arms control treaties and non-proliferation regimes, as well as conducting domestic activities to counter WMD proliferation, such as screening visa applicants who might present a WMD proliferation risk.

Also, number of mechanisms and committees are in place to help facilitate information exchange, rationalisation of effort and joint decision making where necessary, in regard to WMD issues. Major areas of collaboration are in domestic and international outreach and in the development common useful regulatory management tools and outreach products.

THE IMPORTANCE OF UNIVERSITIES

From a WMD proliferation prevention perspective, universities are a key area of interest, both because of their potential to inadvertently contribute to programs of concern and the limited coverage and understanding that Government agencies have of universities activities. Their work is likely to be diverse, often cutting-edge research, and with a strong and natural propensity towards intellectual freedom.

Within universities, there may well be risks associated with:

- Inadequate security for dangerous materials and agents;
- Some transfer/publication of information associated with sensitive dual-use technologies;
- Unregulated import/export of controlled commodities; and
- Research of concern by foreign students

Inadequate controls and practices in these areas may have both proliferation and terrorism consequences. Certainly there is evidence, most clear in the case of Iraqi past WMD programs, of their leading scientists being trained in Western countries, including in Australia. Iraq's programs also drew heavily on the scientific literature and seed biological agents came from the American Type Culture Collection (ATCC). In the future university sourcing and transfer or publication of advanced biological research may be the highest areas of risk.

Recently, university toxin researchers in Australia approached the Government for advice on how best undertake necessary scientific publications and secure details of their work, while minimising the possibility of it being misused by others. The Government is exploring the best practical means to meet these types of security needs without imposing interfering with academic freedom.

UNIVERSITY SAFETY OFFICERS

While research areas are probably the greatest potential source of proliferation risk, they can be hard to reach, and not particularly familiar with or attracted to regulations. On the other hand, Safety Officers are likely to have: implementing regulations as their *raison d'être*; good access to research areas and control systems; training obligations; a management mandate; be involved with safe packaging of dangerous goods prior to transfer or export; and have a good understanding of hazardous materials. Furthermore, they tend to be the contact person for the universities that already hold CWC or NPT-related Permits.

As a consequence we see the Safety Officers as an important means of raising awareness in the academic community about proliferation and helping to ensure that existing regulations are met.

OTHER IMPORTANT DEVELOPMENTS

COAG Review of Hazardous Materials

In December 2002, the Council of Australian Governments (COAG) agreed to a national review of the regulation, reporting and security around the storage, sale and handling of hazardous materials. The aim of the review is to identify means to limit opportunities for the illegal/unauthorised use of hazardous materials through improvement in Australia's regulation, monitoring, control and education systems concerning such materials in order to assist **counter-terrorism** efforts.

The work was divided into following logical subject areas undertaken by working groups led by relevant Commonwealth agencies:

- Ammonium nitrate (given a priority);

- Chemicals;
- Biological agents; and
- Radioactive materials.

The ammonium nitrate report has been completed and controls are now being implemented. The other reports are in an advanced stage, with the biological report foremost. It will be the first to be considered by peak industry and professional groups.

The biological report will recommend additional security measures for laboratories holding particular agents considered to be of security interest. These will include physical security measures along with background checking for staff with access to the agents. The list of agents of security interest was derived using an intelligence-based risk management approach to minimise the cost to industry and academia, while ensuring the agents are controlled. The list of agents is broken down into two tiers, with security measures proportional to the assessed level of risk posed by each tier. This list of agents will be regularly reviewed according to the intelligence informing the list.

The report also recommends an ongoing education and awareness raising campaign on biosecurity to ensure that universities and laboratories are kept informed about the COAG review and biosecurity issues more generally.

Code of Conduct

As a result of international efforts to strengthen the BWC, a series of experts meetings have been convened in Geneva. Amongst other things, the meeting in 2003 had biosecurity as a key topic and some of the elements of best practice identified then have been made use of in the COAG review.

This year, Codes of Conduct for Scientists are being considered. Australia's preparation for this has helped identify local opportunities for such Codes, which is being reflected in our national contribution to the meeting. It is also hoped that the results of the meeting will be used back in Australia. One of the best local opportunities may be to incorporate non-proliferation and counter-terrorism elements into the Australian Code for Research Practice 2004 being jointly developed by the NH&MRC, ARC and AVCC. If this incorporation occurs here or possibly in other Codes, there may be a need for university researchers and safety officers to address them in work practices.

IN CONCLUSION

So there are many existing and likely to be more regulations relating to management of hazardous and dual-use materials from a non-proliferation and security perspective. We believe that current controls are well observed by industry but are less certain in regard to academia, more through our lack of knowledge than evidence of non-compliance. University safety officers may provide us with the means to clarify this situation and to ensure that where there is a need for improved controls in such institutions, this is achieved.

The ways that safety officers may assist Government to pursue our non-proliferation and counter-terrorism agendas are listed below. To facilitate this we provide you with a package of reference materials including: an International Chemical Trade Control CD; an ASNO CWC Guide for Australian Industry; an Information Guide on Weapons of Mass Destruction; and a brochure on the Australia Group. It should be noted that WMD-related equipment that is controlled for export is not referenced here, usually being less relevant to universities. Full lists of such controlled equipment appear at the following DTCC website - www.defence.gov.au/strategy/dtcc/default.htm

WMD Regulatory checklist:

- Determine from the CD or CWC Guide (both at www.dfat.gov.au/cwco) whether any specified chemicals are synthesised (only CWC Schedule 1), imported or exported – Contact ASNO or DTCC;
- Determine if any of the micro-organisms or toxins listed in Annex 1 are being exported – Contact DTCC;
- Determine whether any of the nuclear-related materials in Annex 2 are held – Contact ASNO;
- Report any suspicious WMD-relevant activity by foreign researchers or students – Contact DFAT;
- Report any theft or unaccounted loss of hazardous materials to the National Security Hotline on 1800 123 400, and relevant local authorities; and
- If possible, include security as part of safety practices for hazardous materials.

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ANNEX 1

MICRO-ORGANISMS AND TOXINS REGULATED FOR EXPORT

This listing is a simplification of the domestic control lists, the full details of which, together with exemptions and reference to genetic modifications, are available at: www.defence.gov.au/strategy/dtcc/default.htm

HUMAN-RELATED AGENTS

Viruses

1. Chikungunya virus
2. Congo-Crimean haemorrhagic fever virus
3. Dengue fever virus
4. Eastern equine encephalitis virus
5. Ebola virus
6. Hantaan virus
7. Junin virus
8. Lassa fever virus
9. Lymphocytic choriomeningitis virus
10. Machupo virus
11. Marburg virus
12. Monkey pox virus
13. Rift Valley fever virus
14. Tick-borne encephalitis virus (Russian Spring-Summer encephalitis virus)
15. Variola virus
16. Venezuelan equine encephalitis virus
17. Western equine encephalitis virus
18. White pox
19. Yellow fever virus
20. Japanese encephalitis virus
21. Kyasanur Forest virus
22. Louping ill virus
23. Murray Valley encephalitis virus
24. Omsk haemorrhagic fever virus
25. Oropouche virus
26. Powassan virus
27. Rocio virus
28. St Louis encephalitis virus
29. Hendra virus (Equine morbillivirus)
30. South American haemorrhagic fever (Sabia, Flexal, Guanarito)
31. Pulmonary & renal syndrome-haemorrhagic fever viruses (Seoul, Dobrava, Puumala, Sin Nombre)
32. Nipah virus

Rickettsiae

1. Coxiella burnetii

2. Bartonella quintana (Rochalimea quintana, Rickettsia quintana)
3. Rickettsia prowazeki
4. Rickettsia rickettsii

Bacteria

1. Bacillus anthracis
2. Brucella abortus
3. Brucella melitensis
4. Brucella suis
5. 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
15. Enterohaemorrhagic Escherichia coli, serotype O157 and other verotoxin producing serotypes

Toxins as follow and subunits thereof:

1. Botulinum toxins ⁴
2. Clostridium perfringens toxins
3. Conotoxin
4. Ricin
5. Saxitoxin
6. Shiga toxin
7. Staphylococcus aureus toxins
8. Tetrodotoxin
9. Verotoxin
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)

ANIMAL-RELATED AGENTS

Viruses

1. African swine fever virus
2. Avian influenza virus
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

Bacteria

Mycoplasma mycoides

PLANT-RELATED AGENTS

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

NUCLEAR MATERIAL THAT MAY REQUIRE A PERMIT

A permit for possession of nuclear material is usually required if a person or organisation possesses any uranium (including depleted uranium), thorium or plutonium -- in any compound form. There are some exceptions but essentially there is no de minimus quantity below which a permit is not required. Examples controlled nuclear material include:

- depleted uranium shielding,
- thorium and uranium acetates, nitrates, oxides etc
- small plutonium neutron sources
- small samples of enriched uranium