SECTION ONE

A CHANGED ENVIRONMENT: NON-STATE USE AND MICRO-PROLIFERATION OF WEAPONS OF MASS DESTRUCTION

A Changing Perspective – The Asymmetric Threat

The passing of the bipolar environment that existed between the United States and Soviet Union has shifted the new security challenges to regional conflicts and increasing asymmetric threats, all set within an unstable multi-polar environment. These new challenges to security have also stretched state paradigms of understanding and their knowledge of these threats. The new security challenges place into question established axioms on the use of unconventional weapons and long held views of the preparedness by belligerents to use more violent and indiscriminate actions. The new asymmetric threats have been characterised by their ephemeral nature and the difficulties in distinguishing between friend and foe, ultimately increasing the frustrations for governments in articulating clear and effective deterrence strategies and counter-measures.

New motives and rationales, increased opportunities, enhanced capabilities in conventional and unconventional weapon systems and more complex non-state organisational structures appear as a portent for a new century more uncertain, yet more dangerous, than ever before. Of greatest concern, increasingly lethal conventional capabilities and interest by non-state organisations in unconventional weapon systems, appears to be growing. Incidents such as the Tokyo subway nerve gas attack in 1995 by the Japanese Cult Aum Shinrikyo, highlights the potential vulnerabilities and the difficulties within governments to overcome policy inertia and paradigmatic counter-strategies, ultimately vitiating

any efforts directed towards the development of more effective deterrence structures and the management of the risk.[1] Existing axioms in the analysis of the preparedness by non-state elements to apply ultra-violent measures and of established theoretical models of behavioural and targeting strategies, now appear anachronistic when attempting to calibrate the range of existing non-state activities. Increases in religious fundamentalist and right wing motivated terrorist activity, often involving the use of extremes of violence, now dominate the global landscape. This is in stark contrast to the more traditional activities by ethno-nationalist and separatist terrorist groups that had dominated reporting in the past. The trend over the recent decade towards the targeting of non-combatants and lightly protected civil facilities, when contrasted against more pervasive proliferation in unconventional weapons, suggests enhanced capabilities, changing adversaries and new motivations, but most significantly – escalating potential.

The utility of conventional forces to counter these unconventional asymmetric threats has more commonly proven ineffective. States are left to ponder the litany of errors in foreign policy and social reform from the application of poor analysis and ineffectual deterrence strategies against asymmetric threats, too often struggling to move beyond conventional military responses to unconventional threats. The anachronistic application of deterrence theory has a

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[1] Analysis of trends and patterns of chemical, biological and radiological (CBR) activities reflects wide ranging contention over issues of classification and indeed, what will be the criteria used to even define the scope of any CBR threat. Analysis is generally based on data drawn from reporting of incidents by the United States Federal Bureau of Investigation (FBI) (reflecting cases opened), wider academic sources (such as the Monterey International Studies Institute Terrorism Chronology), or directly from media reporting. The FBI recorded incidents are specific to the United States threat environment and cover a wide range of different categories of CBR incidents that are nearly all specific to domestic terrorist and criminal activity. The second major source of statistical data on CBR incidents is the Monterey Terrorism database, which was developed by the Monterey Institute of International Studies. The Monterey database seeks to record all CBR incidents from 1900 to the present. Trends from both databases generally reflect increasing CBR activity, yet most reporting of activity remains constrained to threats of use (in many cases categorised as hoaxes), small quantity possession and limited 'low end' spectrum use of industrial isotopes, pathogenic/non-pathogenic organisms, toxins and industrial chemicals (constraints in the categorisation, classification and level of reporting of the CBR incidents are explored in later sections of the thesis). Confusion in the nature of CBR reporting is the derived from the lack of completeness and relevance in the extrapolation and comparison of trends from the non-state use of conventional capabilities, the simple paucity of reporting, the increasing emphasis on vulnerability throughout analysis and the limited population and veracity in the population of databases. Monterey Institute of International Studies – Centre for Non-proliferation Studies, *2000 WMD Terrorism*

tiredness and lack of effectiveness in its attenuated form which has been belaboured unsuccessfully throughout numerous regional and asymmetric conflicts, such as those in Somalia, Chechnya and Afghanistan. A reliance on armed conventional forces and an increasing dependence on force projection to overcome these threats has proven largely ineffective. Further, the accompanying strategies for ad hoc responses by state parties with ill-prepared conventional response elements largely suggests a greater vulnerability and increased risk from non-state threats.

The modifications and 'finetuning' undertaken in western responses to non-state threats is increasingly ineffective having been implemented over a decade ago in response to suicide bombings, armed assault, hijackings and the rising threat of state-sponsored terrorism throughout the 1980s and early 1990s. The potential irrelevance of much of this thinking is evident in the inability of existing anti-terrorist measures, counter-proliferation and non-proliferation normative practices, which have found only limited relevance in reducing non-state use and the development of weapons of mass destruction (WMD).[2] The difficulties in assessing actual and potential threats and the absence of any analysis of preemption and deterrence strategies, has been compounded by a serious lack of

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Chronology: Incidents Involving Sub-national Actors and Chemical, Biological, Radiological and Nuclear Materials. Accessed 21 March 2001 at http://www.miis.edu/pubs/npr/wmdchr72.htm.

[2] The term 'WMD' denotes the spectrum of weapon systems and technologies that can effect an outcome which involves 'mass destruction'. Whilst even events such as natural disasters or industrial accidents can result in a 'mass destruction', for the purposes of this thesis the term will specifically apply to the supporting technologies. This includes explosives, fissile materials (which is later excluded) and CBR agents, micro-organisms, toxins and radioisotopes (which the research later dismisses as incapable of achieving a mass casualty outcome). The thesis will, however, primarily focus on that narrow range of capabilities that have the wider potential and greater utility (when developed and applied effectively) to result in a catastrophic outcome – CBR agents. While explosive materials can be used to achieve this effect, and have already been many times, the regulatory structures that govern handling, access, manufacture, transport, licensing and use are generally subject to the same regulatory structures that control chemicals, albeit the technologies and actual uses are far simpler than those required to employ chemical warfare agents effectively. Regardless, the overarching regulatory structures apply throughout the spectrum and it is the theory of the regulatory structures, their application and the exercise of the controls that is critical, rather than the characterisation of specific precursors or their agents, hence the research has been primarily applied to the control and regulation of CBR capabilities as a WMD.

government and academic attention to WMD non-state activities, at least up until the terrorist attacks against the United States of 11 September 2001.[3]

In terms of what this new threat landscape may potentially look like, analytical projections of non-state capabilities over the next two decades identifies an increasing sophistication in conventional and unconventional weapon systems suggesting greater lethality and the capability to achieve mass casualties. Most alarmingly, non-state organisations are more likely to be funded through organised crime, indicating that the delineation and taxonomy of criminal and terrorist activity will become more complex than previously experienced. The lack of direct sponsorship from states, such as has previously existed with countries such as Libya in their funding of terrorism groups, will force non-state entities to seek increased revenue from criminal activities. Disaffected states, domestic and international terrorists and organised criminals have in the past taken, and will continue to take, advantage of the new high-speed information environments and advances in technology to integrate illegal activities and compound the threat to the stability and security of democracies. The transnational nature of these activities will also cause various export control regimes and sanctions to become less effective through the diffusion of technology, increasingly porous borders, defence industry consolidations and reliance upon foreign markets to maintain profitability. Arms and weapons technology transfers will be more difficult to control with WMD capabilities, indigenously produced or externally acquired, becoming more widely available to non-state belligerents, many of which will be hostile towards western democracies.[4]

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[3] B. Hoffman, 'Terrorism and Weapons of Mass Destruction: Some Preliminary Hypotheses', *The Non-Proliferation Review*, Volume 4, Number 3, Monterey Institute of International Studies, Spring-Summer 1997, pp 45-51.

[4] The analysis and prospectus of future trends and developments is based on an assessment made by the United States National Intelligence Board, *Global Trends 2015: A Dialogue about the Future with Non-Government Experts*, 2 December 2000, (accessed 12 January 2001), http://www.cia.gov/cia/ publications /globaltrends2015/index.html#link2. Also see Department of State, *Patterns of Global Terrorism 2000*, Department of State Publication, Washington DC, (accessed 12 May 2001), http://www. state.gov/ www/global/terrorism/2000report/2000index.html

Disaggregating the Analysis Process

There is a plethora of analysis and assessment of terrorist and criminal activities, yet not surprisingly, most has focussed on the utility for employment of conventional weapon systems, colloquially referred to as 'bombs and bullets'. Further compounding this is a penury of credible analysis and assessment of risk along with a lack of any detailed and credible exegesis of the threat. A wave of public anxiety regarding perceptions of vulnerability, largely as a result of greater coverage by the media, is most likely the major catalyst that has contributed to current misunderstandings and skewed perspectives of the risk associated with WMD capabilities. These considerations, when further combined with a largely vacuous policy agenda and a preparedness by governments to dramatically increase funding without a clear understanding of priorities and effectiveness, provides for an environment which is fertile for inefficiencies, ineffectiveness and a failure to address those more critical issues, such as preemption and deterrence strategies.

Misleading reporting of non-state organisations, overstated unconventional weapons capabilities and incorrect analysis of the relative ease of use and access to WMD has contributed to an absence of informed judgement and non-alarmist and non-sensationalist responses by states to these threats. The immediate consequence to perceptions of increasing vulnerabilities by governments has been to dramatically increase barrier and exclusion controls, focussing efforts primarily on domestic and civil preparedness and the escalation of response capabilities. The justification and utility of these measures and strategies, however, appears to have outrun considered and balanced analysis of the actual risk. Despite this praxis, the overall utility of much of this effort has more often provided only the pretence of deterrence. While these measures may in part mitigate vulnerability, in the end, they provide only one element of what should be a wider stratagem of deterrence measures.

Analysis of CBR micro-proliferation and use within an Australian threat landscape is complicated by a lack of understanding of the nature and scope of

the threat and the associated risks from CBR WMD activities.[5] Combined with this lack of understanding of the non-state risk from unconventional capabilities, are wide ranging misperceptions and naïve expectations of existing regulatory norms and the criminal judicial system. Despite these expectations, there remains only a limited understanding by government strategists and analysts of the non-state use of conventional weapons. There is even less known of non-state entities and their proclivity to adopt and use unconventional capabilities, particularly when it involves aspects of development and micro-proliferation. This is the case within an Australian environment where the frequency of incidents and reporting of non-state activity appears to be very low, which only serves to further promote a very narrow and parochial approach to the management of risk. The perception of low levels of activity then comfortably provides for the appearance of a relatively benign threat landscape, yet how confident can government be that the full nature of the problem is understood? There remains little margin for error in any of the assessments – high or low. The potential for a consequence of a catastrophic nature if the assumption is even slightly wrong is now increasingly more real than ever, yet it does not appear to be fully appreciated by states or their governments.

The Regulatory Pretence – An Australian Security Model

Non-proliferation and counter-proliferation regulatory measures are applied to a wide range of materials, equipment, services and functions, yet they remain limited in their relevance and ability to control unconventional weapon capabilities, particularly in mitigating micro-proliferation. Non-proliferation norms have in the main been directed at, and calibrated for, state sponsored nuclear, biological or chemical (NBC) programs. As a result, domestic

[5] The term CBR WMD will specifically apply to those acts which employ CBR agents, micro-organisms, toxins or radioisotopes to achieve a mass casualty outcome. Implicit within this definition is the term 'catastrophic' suggesting numerous fatalities/casualties, major national economic impact and significant psychological effect beyond the tactical implications of the incident itself. It is this spectrum of incidents that will denote 'high end' spectrum activity. 'Low end' spectrum activity will then refer to materials, such as toxic industrial chemicals and biological materials, that would potentially only be capable of effecting a more discriminate and limited outcome. Albeit, a low end spectrum activity may still potentially result in numerous casualties and fatalities, yet it is more likely to be limited to those activities highlighted throughout the current range of CBR reporting.

regulatory efforts have been focussed more at the fulfillment of Australia's international treaty obligations and compliance with export regulatory criteria than with the requirements for domestic criminalisation and enforcement of non-state capabilities. The quantities that would be of potential utility for non-state capability development suggests that the existing volume, weight, ratio and quantity thresholds are more porous and less effective as counter-measures than is widely perceived. Additionally, in cases where the legal authority does exist to legislate against non-state capability development, there is often a disjuncture between the legislation and the ability to actually impose and enforce the necessary regulatory requirements.

The consequence of this collective failure to harmonise consensus of the risk, particularly aspects of threat, results in remediation being primarily limited to barrier and exclusion restrictions along with the prospect of only limited punitive measures being applied as a deterrence. Controls are further weakened when it is considered that they are set within a criminal justice system that aims to reduce infringements on personal rights and maximise individual freedoms. The normative practices and structures that then attempt to regulate dual-use technologies (those technologies that can be utilised within an offensive program and are also used commercially) are limited as they only provide for the protection of human, animal and environmental health. That is, measures are applied through the imposition of occupational, health and safety requirements primarily directed at the regulation of exposure, hazards and handling, rather than considerations of security. The consequence of this inability in the capacity of the normative structures to effectively control WMD capability development is at odds with the assumption that risk is effectively managed nationally and that existing non-proliferation and counter-proliferation structures do maintain the capacity to deter non-state CBR threats.

In essence, when deterrence theory is applied throughout a national strategy it aims to preempt non-state capability development and the use of WMD. It is predicated, however, on the ubiquitous and pervasive application of controls across the spectrum of CBR materials, equipment and services. Most extant

international and national regulatory norms lack wider harmonisation with other national micro-regulatory processes where structures predominantly operate in parallel rather than complementing each other. The focus and structure of existing regulatory measures as a consequence is largely reactive and fails to meet changes across the non-state threat spectrum. Most particularly, the structures lack the capacity to effect any reasonable measure of control against unconventional weapons development and micro-proliferation, especially in those situations involving dual-use materials, equipment and services.

Export regulatory structures have long been established for many sensitive and dual-use technologies, particularly in the control of fissile materials. In the main, however, they have been directed against conventional weapons and limited windows throughout the technology development spectrum. While there are increasing efforts towards the development of measures which attempt to curb the potential for proliferation of chemical and biological materials, equipment and services, the ability to influence real change against micro-proliferation and development initiatives appears out of step.

Relatively recent changes in the development of non-proliferation and counter-proliferation regulatory efforts can be attributed to two key events. The first of these was as a result of the failure of international regulatory norms to mitigate Iraq's active and effectively targeted WMD proliferation activities from as far back as the 1980s. The second event involved the Tokyo subway nerve gas attack by the Japanese Aum Shinrikyo Cult in 1995 which highlighted, *inter alia*, the largely unregulated national and international environment for the control of CB capabilities and their development. The most significant concern being the relative ease with which a non-state organisation had been able to develop unconventional weapons which in the main had been facilitated through the

legitimate acquisition and development of dual-use materials, equipment and services.[6]

The Development of a Weapons of Mass Destruction

The development and use by the Aum Shinrikyo Cult of an indigenously developed cholinesterase inhibiting compound – O-isopropyl methylphosphonofluoridate (sarin), and its subsequent use in a Tokyo subway, crossed a technical threshold in non-state WMD capability development. Similarly, the attacks in the United States against the World Trade Centre and Pentagon buildings that resulted in approximately 3000 deaths also marked an erosion of the inhibitions of non-state actors in their preparedness and capacity to actually cause mass casualties.[7] While the attack against the Tokyo subway was a portent of changing technical thresholds and ideologies in non-state organisational dynamics, it did not herald, as was widely averred, the greatly accelerated changes in targeting, capabilities, preparedness and the willingness by non-state actors to more quickly adopt complex WMD technologies.

The potential to utilise many WMD capabilities, particularly CBR agents, has always existed, but any use has been constrained by social, technical, behavioural and capability limitations. While the major limitations in use would

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[6] This comment refers directly to the consolidation of Australia Group Controls, development of the Chemical Weapons Convention and the series of domestic reviews on Defence Exports initiated in the early 1990s. In the period following the sarin gas attack in March 1995, Australia also introduced the Weapons of Mass Destruction Act (1995) along with increased export regulatory measures implemented through the Defence Strategic Goods List 1996.

[7] Despite the wide assertion of state sponsorship of Usama Bin Laden and the organisation Al Qaida by the Taliban Government of Afghanistan, in terms of the organisation's capability and operations they would still be considered as a non-state entity (particularly given the failure by the United Nations and western governments to recognise the Taliban). The distinction has many shades of grey and countries such as the United States vehemently disagree with this position, arguing that Bin Laden's operations and structure have been largely facilitated by the Taliban – a point which is not in contention. While the vagaries of non-state organisational structures will never allow for consensus on this issue, for the purposes of this thesis, entities such as Bin Laden's will be classified as non-state and those operating directly as covert military forces or under direct sponsorship will be considered as state-sponsored. State sponsorship is more than concessions in allowing an organisation to be provided with safe refuge, which is arguably similar to the case of the Aum Shinrikyo and the freedoms and privileged status provided to them by the Japanese Government as a religious organisation prior to 1995. State sponsorship defines the capability and capacity of the organisation, most particularly the provision of services and support provided by the sponsoring state.

have undoubtedly been attributable to a lack of technical proficiency and scientific acumen, the influence that values, ideologies, varying legitimisation mechanisms and the risk of potentially counter-productive outcomes would have had in inhibiting use cannot be underestimated. While the Japanese Cult's use of chemical warfare agents was not the first, the use, development and employment of CB capabilities had always in the past been limited to state WMD programs. Hence, the distinction between state and non-state potential is critical in distinguishing between critical aspects in the assessment of capability and capacity.

Concerns about the potential of WMD capabilities and the preparedness by governments to impose regulatory controls over dual-use materials, equipment and services has tended to ride a wave of public anxiety derived more from the profile of the last incident than the moral imperative or actual requirement to counter specific threats. What could be more spectacular in this sense than the threat or use of a weapon that is potentially capable of killing hundreds or thousands of people in a single incident? If non-state actors were to use chemical and biological weapons in a mass casualty attack, there is no doubt that it would be an event of singular visibility and importance. The particular organisation would likely receive enormous publicity and the event would be perceived as not just another assassination, kidnapping, bombing or hijacking, but as an event of cataclysmic proportions, possibly even greater in its social and political impact than the 11 September 2001 mass casualty attacks against the United States.[8]

Public officials, particularly within the United States, have often played out this parody involving worst case attack scenarios which draw heavily on perceptions of vulnerability for greatest impact. At a press meeting in November 1998, the United States Secretary of Defence, William Cohen placed a bag of Domino sugar on his lap and 'noted that just that amount of anthrax could effectively

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[8] E. Hurwitz, 'Terrorists and Chemical/Biological Weapons', *Naval War College Review* 35:3, May-June 1982, pp 36-40. This is, of course, is borne out by the mass casualty outcomes of the 11 September 2001 terrorist attacks in the United States, which marked a significant global shift in how domestic security will be viewed in the future.

poison the water supply of the city of New York' – reminding people of their own vulnerability and that his concerns appeared absolute.[9] The corollary to this is that the technical, scientific and engineering limitations in developing, disseminating and operationally employing CBR agents as a WMD capability requires a very high level of proficiency throughout a range of diverse skills. These are not as easily available or developed as is surmised throughout a wide range of the current reporting.

Increased diffusion, reduced regulation and wide availability of risk CBR materials, technologies and services is a major contributing factor in the growing reporting of interest, possession, development and use of CBR agents. For example, the FBI increasingly opens more criminal cases each year involving possession, threats of use or the actual development of CBR materials.[10] The lack of policy, coordination and actual collection processes within an Australian security environment makes this exercise difficult and critically, potentially inaccurate. Reporting is swept up with general criminal and bombing incidents with little qualified analytical rigor applied to the projection of trends and patterns of activities. Most alarmingly, reporting structures that should be capturing and processing these incidents are in most cases, discretionary. In the main they are based only on use and fail to include data that correlates inconsistencies and irreconcilable reporting in trade, procurement, research and consumption activity. The parochial nature of policing and security throughout

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[9] C. Rice, 'Deterring the Use of Biological and Chemical Weapons', in *The New Terror: Facing the Threat of Biological and Chemical Weapons*, eds S.D. Drell, A. D. Sofaer, G. D. Wilson, Hoover Institution Press, Washington D.C., 1999, p 397. Cohen was seeking support at the time for the Coalition bombing of Iraq and was attempting to play up the threat from WMD. This was against a background, particularly during 1998, of media saturation of reporting on WMD terrorism by groups such as Usama Bin Laden's, which culminated in the United States strikes in 1998 against his reported terrorist network in Sudan and Afghanistan.

[10] Data compiled by the FBI reflects criminal cases since 1995, rising from 37 in 1996, to 74 in 1997, 181 in 1998 and approximately 200 in 1999, with three quarters of the cases involving the threat to release biological agent. The data only reflects domestic criminal incidents for the United States, but is still an indicator of, at a minimum, increasing interest. There is difficulty in the interpretation of the data as detailed collection only began from the mid 1990s, hence increases in the data could partially be attributed to more efficient collection and reporting. Additionally, the FBI data reflects 'cases opened', many of which were later found to involve only hoax or nuisance type activities, rendering the finalisation of the statistical trends, incomplete and possibly inaccurate. B. Marinez, Deputy Director, National Domestic Preparedness Office, Federal Bureau of Investigation, *Statement before United States House of Representatives on Preparedness for Terrorism Response*, 9 June 1999, (accessed 1 December 2000). http://www.fbi.gov.pressrm/congress/congress99/comterr.htm.

most national jurisdictions, combined with a lack of overarching federal policy and processes for collection and analysis of reporting, suggests that collection is capricious and relies too much on the discretion of services and jurisdictions as to whether they collect, notify or report activities, and just as importantly, how they subsequently categorise those activities. It is this reporting, or more specifically the capture of information, that is ironically at the core of any national capacity to remain informed and respond to, deter, and ultimately manage, the risks from non-state threats.

Caution must be exercised in the assessment of trends in proliferation, threats of use and possession of CBR capabilities throughout the United States, or indeed any other country, and then attempting to extrapolate and superimpose this analysis throughout an Australian environment and context. The increasingly transnational nature of non-state activities, particularly micro-proliferation, through organised crime, financing, sponsorship and recruitment networks suggests that Australia's geographical isolation also provides no assurance or protection other than through distance.[11] Patterns and trends in Australia of illegal use, acquisition and proliferation of explosives and deleterious materials provides possibly one of the few litmus tests in the potential of belligerents. It offers one of the few insights into a sector of activity that could possibly demonstrate the propensity of individuals and groups to use violence, and as critically, it suggests thresholds in belligerents social and behavioural normative values. The process, however, is fundamentally and structurally flawed as it fails to consider developmental activity (most of which could be carried out legally), aspects of proliferation, and activities other than actual use.

Data compiled by the Australian Federal Police on bombings, explosives and general criminal behaviour indicates a proclivity towards the use of explosive materials, as opposed to many of the more unconventional technologies. While this factor could be attributed to many variables, one key reason is simply that explosive 'types of materials are more readily available within Australia than

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[11] Office of Secretary of Defence, *Proliferation: Threat and Response January 2001*, Washington DC, 2001, pp 3-8 and 61-87.

other countries' due to the wide usage throughout the mining and agriculture industries.[12] Trends, other than the increasing predominance of hoaxes and that most of the activity remains criminal in scope, are difficult to further extrapolate for a more detailed and critical assessment of any CBR potential. This is particularly so because the processes that involve the initial collection and assessment of information are systemically and structurally flawed.

While current patterns in national activity reflect the use of explosives and deleterious materials, these have generally been limited to acts of revenge, robbery, single issue acts and domestic incidents, all of which remain distinctly criminal in scope.[13] Yet similarly to overseas reporting of criminal and terrorist activities, the national trend over the last ten years affirms a propensity towards the increased lethal use of violence.[14] Yet activities involving explosives, bombings or a predisposition for violence, do not appear to be reflected in the causative relationship linking CBR use with criminal and terrorist activities. Similarly, there is also no clear causative correlation or linear development that can be established with incidents involving low end spectrum use, such as poisonings, and a proclivity towards the use of high end CBR capabilities. Regardless, when considered against the mercurial and increasingly lethal nature of non-state threats, particularly following the 11 September 2001 terrorist attacks, governments are now more than ever, morally, politically and

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[12] Data compiled by the Australian Federal Police Bomb Data Centre reflects over the last decade, 32 percent of incidents have involved the use of explosive fillers. This compares with 36 percent for CO_2 cylinders, 6 percent for incendiary fillings, 8 percent for chemical reagents, 2 percent 'unknown' and 7 percent as hoaxes. Australian Federal Police, *Bomb Data Centre 2000 Annual Report*, 30 March 2001, (accessed on 30 May 2001), http:///www.afp.gov.au/abdc/1999.pdf. Interestingly, the Australian Bomb Data Centre conceded that the capture of incident reporting is an incomplete and potentially inaccurate process. Categorisation of incidents is ambiguous due largely to the application of typologies, a lack of information available or that the incident was defined simply on the basis of an outcome, such as a fire or explosion, rather than the use of contaminants. For example, incidents are often categorised as 'fire' due to the interpretation of the responding agency or process of reporting bomb incidents throughout the different police jurisdictions and amongst the emergency services involved in any response. Additionally, numerous reports, such as hoaxes, may never be reported beyond jurisdictional boundaries or from within states, and consequently may not reflect actual trends, particularly when it certainly excludes large sectors of reporting, such as hoaxes or low end spectrum CBR use. Personal communication with staff at the Australian Bomb Data Centre, June 2000 through to February 2001.

[13] Personal communication with staff at the Australian Bomb Data Centre, June 2000 through to February 2001.

[14] ibid., The ten year trend of bombings and attempted bombings (as at April 2001) reflects a total of 2760 bombings, attempted bombings and hoaxes – a rate approximated to one incident for every 2000 people.

economically compelled to adopt more active and preemptive measures within national security strategies – domestically and strategically.

The Indeterminateness of Risk

The 2000 Monterey WMD Terrorism Chronology of sub-national incidents covering reporting on CBR and nuclear materials reflects clearly established trends of increasing interest, possession, development and use. The database lists 687 chemical, biological, radiological and nuclear (CBRN) incidents since 1900 through to 1999, with 494 incidents occurring within the last decade and 175 of these in 1999.[15] Most of the incidents were based within the United States and involved the threat of release of anthrax or ricin – with the majority attributable to hoax activity.[16] One of the salient issues within the population of this and other databases, and which is central in efforts to better calibrate risk, is

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[15] The term CBRN is predominantly used by the United States and applies more as a colloquial term rather than one which is reflective of the physical properties or the characterisation of materials. Additionally, as the 'N' denotes, the acronym includes nuclear issues. The analysis within the scope of this thesis specifically excludes nuclear from the research, referring to the agents collectively as CBR. Similarly, when the term chemical and biological (CB) is used, it specifically excludes reference to radioisotopes.

[16] *2000 Monterey WMD Terrorism Chronology*, Interestingly, as a result of several deaths from inhalational anthrax in the United States and a heightened sense of fear following the 11 September 2001 attacks, the reporting of hoax activity, particularly involving biological threats, has saturated most reporting networks, including Australia. As at November 2001, the Australian Department of Defence Emergency Management Australia has reported over 1000 anthrax related incidents during an eight week period Most of these, however, involved suspicious packages or reporting by concerned citizens. Estimates by Emergency Management Australia suggest only up to approximately five percent of incidents involved deliberately orchestrated hoaxes. J. Parachini, *Anthrax Attacks, Biological Terrorism and Preventative Responses*, RAND Publication CT-186, Washington DC, November 2001.

in the classification of incidents.[17] That is, what is it that is to be defined as a CBR agent? What is the spectrum of activities and agents and equally as importantly, what should be assessed as a risk?

The difficulty in the process for the estimation and assessment of risk is that they will always remain out of step while the capacity to collect information across the spectrum of activities is neither pervasive or indeed lacks the veracity necessary for it to be applied effectively. Quite simply, this could be compared to the antecedent that 'we don't know what we don't know'. The systemic failure to identify critical signatures from the background clutter that is predominantly nuisance, hoax and misreporting, only exacerbates the assessment of risk and the inability of existing counter-measures to provide for any capacity in preemption. Consequently, without credible information processes, analysis predicated on incorrectly classified and sampled data will continue to perpetuate systemic intelligence biases throughout the analytical process. Analysis of trends and reporting of CBR activity will always be inherently limited and simply through its nature, will remain largely inductive rather than deductive. This will be further frustrated by a paucity of credible information available and the increasing predisposition by analysts to include 'less significant incidents' within the population of CBR incidents.

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[17] ibid., There are no unclassified databases of incidents maintained for activities throughout Australia. Like most countries, Australia has experienced a range of hoax activity, however, this has generally followed a significant or well known event. For example, following the 11 September 2001 terrorist attacks and spate of inhalational anthrax attacks throughout the United States, there was a marked increase in the frequency and type of hoax activity reported. Compared to countries such as the United States, the scope and frequency of CBR hoax activity has been quite minor, however, it still provides a general indicator of interest and awareness in the issue throughout the community. Any certainty and confidence in the projection of clear trends is constrained given the threat environment and the limitations in the collection of information on the reporting of CBR related activities. Even estimates of any past activity in Australia is uncertain. For example, according to data compiled by the Australian Bomb Data Centre there have been numerous incidents involving the release of lachrymatory and incendiary materials throughout Australia (most involving chlorine or fuel-oil mixtures). The most notable of these was the release in February 1997 of a chlorine and brake fluid homemade device at Bondi Junction in Sydney. Twelve casualties were reported, most with breathing difficulties, however, none were reportedly seriously injured. The incident (which actually involved two incendiary devices), was widely reported as a CBR incident, yet was similar to numerous other incidents that are regularly reported throughout the various jurisdictions. The only difference in this case was the respiratory effects resulting from the combustion of the device and an increasing propensity throughout the press to now attribute unexplained incidents, often involving industrial chemicals, as CBR. Personal communication with staff at the Australian Bomb Data Centre 16 June 1998.

In failing to understand and appreciate the actual scope and nature of the threat as a function of risk, governments struggle to articulate coherent and planned deterrence strategies that are capable of achieving any effective outcome. In particular, the use by governments of flawed heuristic models to articulate concepts of threat and risk, tends to rely more on the visceral fear associated with the action rather than any balanced analysis and assessment process. It was Kahneman and Tversky who first proposed in their economic model, Prospect Theory, that human cognitive difficulties in the process of aversion to loss dramatically influence collective and individual rational decision making.[18] That is, emotions often degrade decision making and more often people are unable to fully understand what they are dealing with. The precepts that embody Prospect Theory equally applies to governments in their capacity to manage risks, as they do to non-state organisations and actions involving risk-taking.[19] That is, losses will always loom larger than gains and any that are unresolved will often provoke intense and irrational fear that promotes strong feelings towards risk-aversion.[20]

Exhortations to develop more intelligence and greater response capacities normally follows any failure within the deterrence system to interdict or neutralise a threat. Government initiatives following the 11 September 2001 attacks against the United States resulted in most western governments scrambling to dramatically widen powers for intelligence services, increase barrier and exclusion controls and upgrade response capabilities. In addition to wider systemic and cognitive difficulties in understanding threat and risk, the inability of governments to detect any rapid escalation in the development of non-state capabilities is central in any ability by a state to counter threats. Paradoxically, considerations of greater responsiveness are too often mistaken by

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[18] D. Kahneman, A. Tversky, 'Prospect Theory: An Analysis of Decision and Risk', *Econometric*, Volume 47, Number 2, pp 263-291.

[19] The primary hypothesis within Prospect Theory is that aversion to loss explains the propensity to take risks, which in turn increases as one moves down from global to the individual level. R. Tanter. *Rogue Regimes: Terrorism and Proliferation*, St Martins Press, New York, 1999, p 251.

[20] D. Kahneman, and A. Tversky, 'Choices, Values and Frames', *American Psychologist*, Volume 39, Number 4 April 1984, pp 342-347.

governments as the only measure through which to mitigate threat. The irony will always be that regardless of the latest detection and protection capabilities, whether it is an increase in response capabilities or barrier and exclusion controls, most of these efforts will only ever be applicable after the fact and have a minimal preemptive value.

It is not within the scope or intent of this thesis to examine either the requirement or capacity of response forces, yet needless to say capable and effective response elements are a critical component in any national deterrence strategy. There already exists a wide array of comprehensive analysis of crisis and consequence management structures and efficiencies, however, what is in contention is the preemptive value in the often disproportionately weighted and response-centric focuses by governments. Similarly, the opportunity costs to capacities, capabilities and resources in applying a policy of risk aversion cannot be understated. The resource and financial costs in sustaining a deterrence structure based primarily on response counter-measures, or indeed based on a philosophy of a 'fortress Australia', particularly beyond the short term, is unsustainable and impracticable no matter how well resourced or high the level of threat. The use of guards, alarms, barriers and well trained response elements are finite resources and the opportunity costs to education, health and critically, civil liberties, can be significant. The issue is not as much a case of one capability over another, rather it is the need for clearly articulated and effective uniformity applied throughout all counter-measures and enacted through effective policy, plans and rational deterrence strategies.

Managing the Risk

The principles of a democratic society set significant limits to preventative actions that might be undertaken as part of national counter-measure strategies. The Australian concept of government is that it should be unobtrusive and should not infringe arbitrarily on civil or political rights. The Government in the main attempts to effect control over CBR risk capabilities on the basis of regulation being exercised through prescriptive lists of agents, micro-organisms,

toxins and radioisotopes. It is a regulatory model that is overly simplistic, porous, relatively easily circumscribed and impracticable within any moderately industrialised society.[21] On this basis there can be no confidence that the current range of normative regulatory regimes are effectively targeted or have the specificity required in their application to minimise the risks from an undetected escalation or use of, WMD capabilities by non-state actors. While many normative regulatory practices may partially minimise vulnerability, the prohibitive costs and the impracticality of any wider application, along with a lack of any preemptive capacity, renders their application other than for consequence management, largely ineffective in reducing most aspects of risk.

Estimating risk across the wide range of dual-use technologies and services, and in the process providing any risk bias with a context throughout a wider suite of deterrence norms, is a challenge where there is no template to calibrate success – only failure. The precept of national risk and its complex dependence on international norms and national regulatory structures will continue as an ad hoc strategy without the inclusion of more effective reduction, detection, enforcement and response deterrence measures. The solution is not as simple as the allocation of more funding or increased punitive measures to enforce compliance. The use by governments of extremes of punitive measures has in the past realised little preemptive success. This is not to dismiss the need in some circumstances for harsher punishments, quite the contrary. Punitive measures have a critical role in establishing the efficacy of deterrence structures. While they influence the terrorists' ability to obtain a capability and effectively apply it, they also impose high costs in any attempt to acquire or use any capability.[22] There is also the case, as with the deterrence value of response elements, that the application of punitive measures is already too late in the

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[21] J.F. Pilat, 'Prospects for NBC Terrorism After Tokyo', in *Terrorism and Biological Weapons: Calibrating Risks and Responses*, ed B. Roberts, The Chemical and Biological Arms Control Institute, Washington DC, 1997, p 16.

[22] M. J. Powers, *Deterring Terrorism with CBRN Weapons: Developing a Conceptual Framework, Occasional Paper Number Two*, Chemical and Biological Arms Control Institute, Washington DC, February 2001, p 17, (accessed 28 February 2001), http://www.cbaci.org/dterringCBRNterrorism.pdf.

process suggesting that the philosophy behind preemption extends well beyond simply the enforcement of regulatory controls.

Counter-measures against non-state micro-proliferation or the use of conventional or unconventional capabilities are prohibitively expensive – economically, socially and in individual and collective freedoms. The level of funding, which is a major driver for any reform process, may not however, necessarily reflect greater efficiencies or effectiveness if strategies and targeting lack focus, coordination and effective implementation. The United States, as an example, maintains one of the most extensive counter-terrorism programs in the world. Expenditure for the United States is projected at US $11.117 billion for financial year (FY) 2001, a growth of 43 percent since FY 1998.[23] Within this expenditure, WMD preparedness spending has increased from US$645 million in FY 1998 to US$1.55 billion in FY 2001 – a 141 percent increase.[24] Yet the question remains as to how effective this expenditure has been and with the prospect, post 11 September 2001, of significant and enduring increases in all counter-terrorist budgets and resources, the need for well defined and prioritised expenditure and policy has never been greater.

Prior to 11 September 2001, Australia's annual budget allocation for counter-terrorism training in the Commonwealth was approximately US$2 million per annum. While operating costs for intelligence, security and police counter-terrorism activities are not available within the open literature, estimates suggest

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[23] The examples provided were for forecast expenditure out to late 2001. The terrorist attacks on 11 September 2001 against the United States, have not surprisingly fundamentally changed all future projections of expenditure. Estimates by United States Government sources within the national media suggest there will be significant budgetary expenditure in the order of two and three fold increases when compared to current trends. Initial estimates suggest (declared) expenditure against counter-terrorism by the United States in the following FY will be in excess of US$40 billion, or possibly greater.

[24] A.H. Cordesman, *United States Efforts To Create a Homeland Defence Capability: A Program and Budget Overview of Federal Spending on Counter Terrorism and WMD*, Centre for Strategic and International Studies, Washington DC, 12 December 2000, pp 7-9.

expenditure to be in excess of US$50 million annually.[25] Interestingly, the United States expenditure on counter-terrorism, per capita, at least when compared to Australia, is greater by a factor of twenty, albeit the nature and dynamics of the threat domestically and internationally are quite different.[26] Surprisingly, expenditure within Australia directed at countering WMD terrorism, per capita, indicates the United States is comparatively greater by a factor of at least 100.[27] What this equates to in terms of capacity and capability is significant, particularly if policies and capabilities are to have any real measures of preemption and deterrence as a strategy. Saliently, however, the United States example also demonstrates that simply applying increased funding to the exercise of countering terrorism does not provide any immunity or indeed guarantees from terrorist attack. Rather, it highlights the need for efficient and effective nationally coordinated strategies, which despite the apparent simplicity of this concept, continues to elude all governments.

The key to effective fiscal management lies in accurately estimating risk, which includes an understanding across all aspects of any inherent biases. The establishment of clear budgetary priorities and the efficient allocation of

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[25] Personal communication with Mr P. DeGraff at Australian Attorney General's Department, Standing Advisory Committee on Commonwealth/State Cooperation for Protection Against Violence (SAC-PAV) Counter-terrorist activities, 21 February 2001. Annual expenditure based on author's estimate which includes an approximation of operating costs for national counter-terrorist elements and security expenditure directed against countering terrorism. Cost estimates of any sort are notoriously difficult given the duplication throughout security and counter-terrorism functions and the inclusion of resources which may not be primarily directed against counter-terrorist activities. Additionally, there are no reliable cost estimates available as many of the normal police and response functions, which are embedded within state budgets for emergency services such as policing, fire services etc, are difficult to reflect against Commonwealth and national expenditure estimates.

[26] Estimates based on projected FY 2001 expenditure of US$11 billion for the United States against a population of 280 million, compared to an estimate of US$50 million expenditure on counter-terrorist activities for Australia with a population of approximately 20 million. As noted earlier, both countries' estimates may vary considerably due to the differing criteria for the capture of expenditure, however, the fundamental issue is that there appears to be a significant disparity in expenditure per capita for countering terrorism.

[27] This estimate is based on proposed expenditure for FY 2001 within the United States of US$1.55 billion. While there are no official figures available on estimates within Australia, there is no specific expenditure against WMD capabilities. State programs and Defence have, however, outside of Olympic requirements, been involved in an acquisition program. This has involved training coordinated by Defence and SAC-PAV and has focused mainly on the state hazardous material (HAZMAT) services and involved acquisition of protective and analytical equipment that would be utilised in civil preparedness programs, possibly against CBR use. Personal communication with Mr D. Patterson, Australian Department of Defence Emergency Management Australia, 3 September 2001.

resources is crucial towards standardisation and reduction of the risk. In the attempts that will follow the agenda set by the events of 11 September 2001 to remedy the lack of any effective deterrence strategy, future government policy and resourcing must not be applied simply in an attempt to overcompensate for years of neglect. The application of funds must be tied to a rigorous appreciation and detailed understanding of trends, patterns, vulnerability and ultimately – risk.[28] Similarly, neither can vulnerability be allowed to be the primary driver for considerations of preemption, preparedness and deterrence. The assumption that a less serious incident can be addressed equally well by planning for the most catastrophic threat, or vice versa, fails to appreciate the wide diversity of challenges and their ephemeral nature in this new era of non-state threats.

The most daunting aspect with these emerging threats is that attempting to counter all the possibilities that may result in dire consequences, cannot be funded. By focusing investments on worst case possibilities the government may be missing the more likely threats. With effective risk management there can be greater confidence any investment is in the right items and in the right amounts. Even within the lower end of the threat spectrum towards which the biological and chemical non-state threat appears to currently lean, the need to prioritise and accurately assess risk has never been more immediate. As such, the articulation and adoption of uniform and credible threat and risk assessments will provide a key step in the critical path development of a cohesive roadmap to justify and target spending.[29]

The Aim

This aim of this thesis is to analyse the use and micro-proliferation of WMD by non-state actors using the Australian regulatory, legislative and security

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[28] United States Congress, *First Annual Report to the President and The Congress of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction: Assessing the Threat*, 15 December 1999, Washington DC (accessed 6 June 2000), http://www.rand.org/organisation/nsrd/terrpanel/ terror.pdf .

[29] H.L. Hinton, United States National Security and International Affairs Division, *United States General Accounting Office, Combating Terrorism: Observations on Biological Terrorism and Public Health Initiatives*, GAO/T-NSIAD-99-112, Washington DC, 16 March 1999, pp 4-50.

landscape as the model. The primary focus is to examine CBR WMD capability development and the effectiveness and appropriateness of regulatory structures and controls that apply to dual-use materials, equipment and services. The research will seek to identify those precepts within a deterrence framework that may assist in the development of a greater national preemptive capacity and ability to apply effective counter-measures against non-state belligerents that may seek to develop and use WMD capabilities. The secondary focus is to demonstrate that prevailing perceptions of the threat and expectations of the effectiveness of current international and national counter-proliferation and non-proliferation security, criminal and regulatory WMD counter-measures, are misplaced.

Thesis Scope: Approaching a New Challenge

The past decade has generated considerable analysis of asymmetric CBR threats. Yet even following the greatly increased awareness in the potential of these unconventional capabilities and the societal vulnerabilities following such incidents as the 1995 Aum Shinrikyo sarin gas attack in Japan, there still remains only a limited understanding of how to develop and apply more effective deterrence measures against any WMD threats and capabilities. Consistently following each crisis there is a re-evaluation by state parties of the collective knowledge of non-state organisations. Each new attack or incident causes the state party involved to exercise a psychological and physical form of closure on why the belligerents acted against that state, and more critically, what processes facilitated the micro-proliferation and use of any lethal capabilities involved. The analysis, not surprisingly, more often fails to progress beyond the need for harsher punitive measures, increased judicial empowerment and the internationalisation of the issues involved. Understanding that the ability to influence non-state WMD development can be exercised through such measures as micro-regulatory reform, continues to elude considerations of preemption in the analysis of non-state threats.

There is no universal apparatus or set of principles that can be discretely applied in measured quantities of foreign policy or domestic reform. Rather the challenges are increasingly complex and diffuse where even if a solution could be applied to today's circumstance, then tomorrow will bring more in its wake – this is the nature of the increasingly ephemeral and amorphous non-state threat. A fundamental lack of understanding of the influences various psychosocial factors have in defining the values and actions of a non-state entity is compounded by a difficulty in recognising the confluence technical, scientific and engineering factors have in shaping the process of non-state development. Yet while government rhetoric and policy exhorts the need for deterrence as a core concept within any national strategy, efforts remain response-centric in focus and are directed at the inevitability of the act and its consequences, rather than measures that actually seek to shape, define and ultimately deter any outcomes.

The capacity and efficacy of national and international norms against non-state use and micro-proliferation in, from, or to Australia, have yet to be explored beyond general perceptions and expectations by government and academia of the impact non-proliferation legislation and controls may have in mitigating state sponsored WMD proliferation. The actual effectiveness of the national CBR regulatory structure and extant criminal legislative processes to reduce, detect, enforce and respond to non-state threats, has not been assessed beyond the broad concepts of export controls and the need for wider anti-terrorist legislation. What this does not acknowledge, however, is that belligerents who may choose to act against Australia or its interests, may already perceive themselves at a loss and are willing to accept levels of risk that might previously have been considered as unacceptable. The question then must be one of how effective are the current national structures in deterring non-state unconventional threats and what are the implicit risks to Australia's national security?

It is this area between the two extremes of export regulatory controls and anti-terrorist legislation that may potentially provide the widest utility in developing effective counter-measures against non-state micro-proliferation and use of CBR

capabilities. That is, those areas that apply micro-regulatory controls and information processes to risk materials, equipment and services and the legislation that provides for the mandate, structure and enforcement of regulation. These requirements, in conjunction with more laterally applied counter-measures, which also includes elements of enhanced export regulation and anti-terrorist controls, may in the end yield a far greater deterrence return than has previously been achieved.

The dilemma is that while there is a need to examine the precepts on which enhanced regulation and legislative controls are derived, they remain unrealised in potential without a wider context of risk within a national deterrence framework. While there is a wide array of analysis on deterrence theory as a tool of foreign policy and the regulation of state parties, its application and utility as a theoretical model was generally considered to be anachronistic following the demise of the global polarisation in the superpower environment. Yet its application to the non-state environment is finding increased relevance and context. The application of deterrence theory when applied to asymmetric threats is fertile ground, even more so when set within a context of risk management and the processes required to assess, calibrate and ultimately reduce exposure to risk. The difficulty in articulating the theory's relevance and application is in requiring it to be applied at the juncture of theory and policy, which in turn relies on inductive analysis and value judgement rather than simply an exercise in quantification and the empirical deduction of trends.

Thesis Structure

The methodology applied in the development and presentation of the thesis involves four key sections throughout the research continuum. The first two sections seek to establish a context on which the later sections depend for scope and characterisation. In its simplest form, the first section of the thesis seeks to define who the controls are to be applied against and examines the dynamics and nature of the non-state threat which may attempt to develop and use WMD capabilities. In the second section, the thesis establishes and defines the nature

of the materials, equipment and services that are to be controlled. This covers the range of WMD capabilities and processes that are considered to be of risk from micro-proliferation or use. The third section examines extant controls and the relative efficacy and application of these measures, along with a theoretical deterrence framework against which counter-measures can be provided with a context. The fourth section involves the identification of key national vulnerabilities and the major precepts which underlie a need for a wider emphasis on preemption within national security strategies. This is in the main effected through analysis of four key deterrence mechanisms involving the reduction, detection, enforcement and responses to, the threat of micro-proliferation and use by non-state elements against Australia or its interests.

Defining the Framework of the Thesis

A key component throughout the research is in defining the utility of the materials, and implicitly, the terms WMD, CBR and the spectrum of applications and characterisation of capabilities, such as those involving dual-use equipment and services. Defining what is understood by the terms WMD and CBR can be confusing as it involves the conflation of two largely separate concepts: that of an act involving mass destruction and that of the use of CBR capabilities. The difficulty is that the focus of the former is often justified on the basis of an increased incidence of the latter.[30] The visceral and emotive nature of the subject of WMD and the potential for non-state use is increasingly politicised, which in itself detracts from any capacity for rational decision making. It is in a sense these strong pejorative connotations that have been associated with the use of the terms like WMD, CBR, non-state and terrorism, that has contributed to the wider misuse and difficulty in unambiguously defining any applications.

There is no clear international consensus on what defines mass destruction and more saliently, there is no context or delineation for its use and application within an Australian environment. Australian references loosely attempt to

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[30] G. Cameron, 'WMD Terrorism in the United States: The Threat and Possible Countermeasures', *The Non-proliferation Review*, United States, Washington DC, Spring 2000, p 165.

define state parties' WMD programs, providing no context or definition to non-state activity involving CBR or WMD capabilities, conventional or unconventional.[31] The current Australian definition, which is derived from the WMD Act (1995), excludes radiological isotopes, the use of conventional explosives when used as part of a mass casualty capability, and ancillary technologies, such as dissemination.[32] The corollary to this is that there remains no capability within the WMD controls to apply the Act if there is no NBC or WMD aspect to the illegal activity. For example, while not categorised as a WMD act, the use by Colin Dunstan in December 1998 of 28 mail bombs which were delivered via Australia Post, provides an interesting comparative analysis in gauging the strength of Australia's terrorist and regulatory legislative structure and its relative utility – or lack there of.[33] Dunstan was prosecuted under Australian Capital Territory legislation and despite the bombs being deliberately designed to cause fatalities, Dunstan could only be prosecuted under relatively minor ancillary charges. These involved six counts under the Postal Act for sending prohibited goods through the mail (covered under Dangerous Goods Legislation) and four for attempted grievous bodily harm.[34]

The second complexity in defining mass destruction relates to the use of the qualifying term which applies to the outcome, that is, catastrophic and mass casualty. While internationally these terms are frequently used, there is no quantifying or qualifying indicator that applies a measure of severity or potential, academically or legislatively. While the United States in these areas often

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[31] A WMD Program as defined within the WMD ACT (1995) refers to 'a plan or program for the development, production, acquisition or stockpiling of nuclear, biological or chemical weapons or missiles capable of delivering such weapons'.

[32] A more detailed analysis of Australian legislative controls and regulatory measures, including the WMD Act, is contained in Appendix One of the thesis.

[33] Personal communication with staff of Australian Federal Police Bomb Data Centre, 23 April 2001.

[34] Personal communication with staff of Australian Capital Territory Department of Public Prosecution, 23 April 2001. The ACT legislation, like some other states, does not specifically prohibit the actual manufacture of a bomb, or the use of materials associated with bomb making (there are, however, some ancillary charges that may apply dependent on other activities involved). Therefore, in theory, a person could potentially manufacture a WMD using conventional explosives delivered as a vehicle bomb, and if stopped by police, would only be liable for prosecution under the territories dangerous goods legislation. Ironically, if a person in the vehicle was in possession of the correct accreditation, licensing and had also complied with the handling specifications for those classes of goods (such as the correct signage on the vehicle), then prosecution would be unlikely to apply (at least for the act itself).

assumes a lead role, even they have no clear agreement on this issue. The frequently used definition by the United States is the federal definition which is derived from the 1998 Nunn-Lugar-Domenici Act. It defines a WMD as 'any weapon or device that is intended, or has the capability, to cause death or serious bodily injury to a significant number of people through the release, dissemination, or impact of, a toxic or poisonous chemicals or their precursors, a disease organism or radiation or radioactivity'.[35] While the issue may appear somewhat irrelevant, the distinction aids in understanding the wide variation in the spectrum of capabilities, production, agents, and dissemination systems that would be required for 'effective' use of CBR agents – indicating that the term WMD is not necessarily synonymous with the use of these agents.

While there is no clear casualty or fatality threshold that defines a WMD, Spinnzak, a leading Israeli terrorism analyst, argues that based on the historical record, the figure 25 appears to be the break point.[36] That is, fewer than 25 would constitute low casualty terrorism, mass casualty would range from 25 into the hundreds and a catastrophic terrorist attack would involve at least 1000 casualties.[37] The difficulty within any of these frameworks is that they fail to incorporate many other factors such as economic and psychological influences. Yet despite these limitations, the criteria does provide the definition with a

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[35] United States Congress, op. cit., pp 81-84.

[36] E. Sprinzak, D. Pluchinksy, P. de Armond, *The Classic Politically Motivated Non-state Groups*, presented at a Chemical and Biological Arms Control Institute Conference 29-30 April 1999, Washington D.C., (accessed 6 June 2000), http://www.cbaci.org/newterrorism.html.

[37] ibid., The figure includes casualties which could be regarded as psychosomatic, where through the influence of factors such as fear and anxiety, people may demonstrate similar symptoms or present as injured, yet may not have been exposed. That is, psychosomatic casualties may be greater than the actual number of casualties and differentiating between the two is often difficult, particularly given the delays in the onset of severe symptoms which in the process of triage following a crisis may be the only discriminatory indicators available to the medical personnel. Therefore the actual casualty and the person presenting with psychosomatic symptoms would have to be treated the same, with only the symptoms and testing in the following days and weeks able to distinguish between the genuine and non-genuine symptoms. Estimates such as those from the outcomes of the Japanese Aum Shinrikyo sarin gas attack in the Tokyo subway, suggests that out of the approximately 5500 casualties, only 600-900 of these would have been considered as casualties that were directly effected by the sarin gas. Additionally, particularly in the case of nerve and blister agents, exposure may often also result in long term neurological effects and/or tissue damage, so initial estimates of casualties may further be complicated by a failure to account for medium to long term consequences. S. Ishikura (Professor of Science at Tokyo University), *Aum's Biological and Chemical Weapons*, Kodansha Press, Tokyo, 2000, pp 31-58.

greater utility than has previously existed and hence, in lieu of any statutorily defined definition, will apply throughout this thesis.

In terms of the CBR agents, 'a highly toxic agent, despite its lethality, does not become a usable weapon until it has been integrated within some form of weapon system or platform, and then made an integral component of planning and operational use'.[38] Therefore, implicit within the definition of the term must be considerations of toxicity, efficacy and availability, yet also the application of an agent as a function of outcome – that is, its utility. Therefore it is the incident, while still considering factors of intent and capability, that is ultimately the determinant of the classification and categorisation of the material rather than the physical characterisation of the chemical, micro-organism, toxin or radioisotope.

Exclusions within the Thesis

Analogous comparisons are often made between CBR capabilities and the use of nuclear weapons. There are also increasing concerns by governments over their own commercial and societal vulnerabilities from the threat of agricultural terrorism. These issues, however, will all remain outside the scope of this thesis. In the nuclear area for example, the regulatory measures applied to many of the technologies and materials associated with development, such as for enriched uranium and plutonium, tend to be far more strictly controlled through regulatory and enforcement mechanisms like the Nuclear Proliferation Treaty. They are also more often specific to task rather than dual-use. Their use, production and the technologies associated with their weaponisation are also not as available within the open literature. Finally, and more critically, there is already a vast array of research on the regulation and non-state use of nuclear materials. Radiological isotopes will, however, be examined due to the fundamentally different controls, pervasiveness and utility of the different isotopes and because of their similar physical characteristics (and categorisation) to chemical agents.

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[38] United States, *Background Paper - Proliferation and Threat for Nuclear, Biological and Chemical Warfare 1997*, United States Congress Publication, Washington DC, p 19.

Agricultural terrorism or 'agriterrorism', will also not be covered as there are significant differences in the use, application, technology and motivating rationales that might apply to the threat or use of any agricultural threats. While theories of terrorist behaviour can never be considered as immutable, agriterrorism does appear to be very narrowly limited to either acts of a criminal nature, such as through extortion, or at the strategic level as a weapon for use by a state against another state. There is an undeniable potential in the utility and opportunity for use of agricultural agents, most particularly due to their likely significant economic impact that would result from use. The assessment of vulnerability from agricultural agents, however, while not in contention, must not be confused with considerations of threat. These considerations, however, tend to be at a radical disjuncture with current ideologies of known and assessed activities by non-state organisations. Albeit, the potential for use of specifically targeted organisms such as wheat smut and rusts against a state party by another state, remains likely in times of conflict and critically, would be unlikely to be attributable. Finally, simply due to the complexity of regulating CBR agents that are primarily anti-personnel, there is not the scope within the research to also include a vastly wider array of agents that have applications against agricultural crops, and therefore significantly different technologies for development, dissemination and regulation. There is, however, some duplication within the controls under such measures as the Commonwealth Quarantine Act and the recently introduced Commonwealth Gene Technology Act 2000, which are covered in the later analysis of non-state use of CBR agents.