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Handbook on Preventing the Proliferation of Weapons of Mass Destruction in the Asia-Pacific
Draft Copy

Council for Security Cooperation in the Asia Pacific
WMD Study Group

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Chapter 1
Statement of Objectives and Basic Principles

Objectives

Weapons of Mass Destruction (WMD) pose a serious threat to all nations and peoples; these dangers are heightened by further proliferation of WMD by states and to nonstate actors. All Asia Pacific governments should therefore commit themselves to active efforts to help prevent and stop the proliferation of WMD and their means of delivery. At the same time, all states that possess WMD must reaffirm their commitment to the objective of eliminating these weapons.

This handbook provides in a single document a summary of the threats and challenges posed by WMD and a description of the global nonproliferation regime (GNR) that has been developed over the years in response. The descriptions of the various components of the GNR highlight its key aspects. In all cases where more information is available on the internet, a link has been provided for those seeking a more detailed account of the specific component. Likewise, a summary of participation by states in the Asia-Pacific is provided in the handbook with a link to a website that provides detailed information regarding participation in a particular component of the regime.

Basic Principles

Adherence to the GNR rests on the following basic principles:

- a commitment by individual nations and the region as a whole to prevent and stop the proliferation of WMD, their delivery systems, and related materials, including dual-use goods and technology;

- a commitment to prevent and stop WMD terrorism;

- a commitment to support effective multilateralism that acknowledges a key role for the United Nations and its instruments in global nonproliferation work, but includes regional, subregional, and plurilateral initiatives. This includes the commitment by individual nations to comply with both the spirit and the letter of their nonproliferation commitments and disarmament obligations under relevant UN resolutions and the international treaties to which they are party;

- a commitment to take all measures to ensure proper protection and safeguarding of nuclear facilities and relevant materials in their territory;

- a commitment to a wide spectrum of measures, ranging from peaceful dispute resolution to the elimination of conditions that lead nations to develop WMD to consequence management if WMD are used. Prevention, counter- and nonproliferation should be included;

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- a recognition of the growing possibility that nonstate actors may acquire or develop WMD, components, materials, or know-how;

- a recognition of the centrality of export controls in any effort to stem the proliferation of WMD, their components, materials, and know how;

- a recognition that the prevention of WMD proliferation should not hamper regional growth and development or international coordination in the use of materials, equipment, and technology for peaceful purposes and;

- a recognition that individual countries will pursue their commitment to take action in ways that reflect their national practices.

Underlying the above principles is the recognition that weapons of mass destruction pose a unique threat to the inalienable right of all nations and peoples to live in peace and pursue economic prosperity.

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Chapter 2
Threats and Challenges Posed by Weapons of Mass Destruction

Weapons of mass destruction (WMD) have been used for a long time. Recorded use of biological weapons dates back to the Middle Ages. Chemical weapons were used on a massive scale in World War I and World War II saw the development and use of nuclear weapons. Recently, the potential use of radiological materials in making radiological dispersion devises or so-called "dirty bombs" has emerged as a new threat. The threat posed by WMD is critical to each individual state's security, and to collective security on a global scale. The magnitude of destruction associated with the detonation of a single nuclear weapon in one of the world's large population centers would be overwhelming. The large number of casualties and the massive damage to the economic infrastructure would be devastating to the individual country and the entire world. The use of chemical weapons or a biological agent in a conflict would produce widespread death among an unprotected civilian population. Due to the varied nature of the WMD threats, it is impossible for any single mechanism to provide sufficient security. Instead, the threat is best addressed through multiple measures at the global, regional, and national level.

Five trends since the end of the Cold War have been identified that change the nature and increase the threat of an incident involving the use of WMD. They are: the growth in the number of nonstate groups motivated by religious conviction or revenge without clear political motivation, the creation of a black market for WMD-related materials and expertise following the dissolution of the Soviet Union, the increased access to materials for developing chemical and biological weapons, advances in technology that have reduced the difficulty of carrying out a WMD attack, and the involvement of organized crime networks in nuclear smuggling and trafficking. These trends coupled with the presence of existing weapons stockpiles make proliferation to undesirable parties, especially terrorists, a growing concern.

There are three aspects to an effective response to the threat of proliferation of existing WMD weapons and materials. First, there must be effective security and safety measures for weapons stockpiles, civilian nuclear facilities, component materials, manufacturing facilities, and research laboratories. Second, measures must be taken to prevent the proliferation of the weapons themselves, component materials, delivery systems, and technology and expertise. This requires an effective global nonproliferation regime in which states work together to combat the threat in a cohesive and collective manner.

A third aspect of the response to the threat of proliferation is the commitment on the part of all states to the elimination of WMD. For biological and chemical weapons, a ban on all such weapons is called for in the respective treaties. Currently, there are no states that acknowledge the possession of biological weapons although some are suspected of either maintaining a stockpile of biological agents or of having an active research program. Most chemical weapons have also been destroyed and all states that have signed the Chemical Weapons Convention (CWC) have committed to eliminating all stockpiles,

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although the process of demilitarizing these weapons has taken much longer than originally envisioned when the treaty entered into force.
The elimination of nuclear weapons has been much more difficult to achieve. First, although the Nuclear Nonproliferation Treaty (NPT) does call on all states to eliminate stockpiles of nuclear weapons, there is no timeline and for a variety of reasons, the five so-called nuclear weapon states (NWS) have continued to justify the need for retaining their stockpiles. In recent years, there has been renewed interest in the complete elimination of nuclear weapons, which is reflected in several initiatives included in this handbook. Many believe that a commitment by the NWS to eliminate their stockpiles is the only effective means to halt the trend in vertical proliferation of nuclear weapon capability to a growing list of states that have demonstrated an interest in acquiring such a capability.

Motivations for Development and Acquisition of WMD

Two primary motivations have traditionally been cited to explain why states choose to develop or acquire WMD: prestige and deterrent value. The applicability of these motivations to the decision making process of nonstate groups is less certain. Although some have argued that these groups would also derive a great deal of prestige and deference from states if they developed a WMD capability, others have argued that these groups tend to be technologically conservative and their objectives can be better met with conventional capabilities.

Since the development of atomic weapons during the World War II, prestige has been an important consideration for states deciding to develop WMD. Because the number of states possessing WMD has always been relatively small due to a variety of factors including resources required to develop these weapons, technical sophistication, and treaty limitations, the international prestige of possessing WMD, particularly nuclear weapons, has been an underlying factor for states deciding to acquire WMD. A common perception that has developed, especially among states aspiring to increase their status, is that a state is taken seriously in the international system if it possesses nuclear weapons. The prohibitions against the possession of biological or chemical weapons contained in the Biological and Toxin Weapons Convention and the Chemical Weapons Convention have served to temper notions of prestige associated with claiming possession of these weapons.

The deterrent value of WMD to a state has traditionally been characterized in terms of the capacity to retaliate in response to an attack by another state, and in the case of biological or chemical weapons, for a relatively low price. Aggressors are deterred if they choose not to act, perceiving the cost of their action to be too high in relation to its likely success.

The end of the Cold War, and the growth of international terrorism as a problem of global importance, has seen the motivations for developing WMD evolve and change. While the sense of prestige associated with the possession of WMD remains an important factor, the deterrent value of maintaining a nuclear arsenal has come under serious question in the

face of continued proliferation and acquisition by an increasing number of states, especially unstable regimes.

Stockpiles

The existence of weapons stockpiles presents three distinct types of threats. First, there is the obvious danger associated with the decision of a state to use these weapons against enemies external or internal. Second, there is the danger of an accidental detonation of such a weapon. Third, there is the risk of theft or seizure by outside forces or diversion by corrupt or disaffected individuals. Ensuring robust command and control of these weapons is of particular concern in countries under societal stress.

Nuclear Weapons

The five Nuclear Proliferation Treaty (NPT) recognized nuclear powers (Russia, China, France, United Kingdom, and United States) all have declared relatively large stockpiles of nuclear weapons and have developed detailed command and control procedures for maintaining them. The U.S. and Russia currently maintain larger nuclear weapons stockpiles than the other three recognized NPT states and also have the world's most advanced delivery systems. Although each state claims to maintain strict accounting of weapons in its possession, there have been reports of lapses in control and questionable security practices associated with these stockpiles.

Four countries have developed a nuclear weapon capability outside the framework of the NPT. Pakistan and India have conducted several nuclear tests and have declared that they possess nuclear arsenals. North Korea has conducted at least two nuclear tests and has declared that it is possession of a "nuclear deterrent capability." It is generally accepted that Israel possesses a sizable and advanced nuclear arsenal, although there is no evidence that it has ever tested a nuclear weapon. Partly because these four states are not recognized in the NPT as nuclear powers, less is known is about the size and security of these stockpiles.

Biological Weapons

Biological weapons are relatively inexpensive to develop and deploy. The dual-use phenomenon – where the expertise, techniques, materials and equipment for weapons manufacture and legitimate uses are very similar – is particularly acute in the areas of biological research and development. Production can be divided into three main stages: a biological agent must first be chosen and acquired, then grown to sufficient quantities (it is here that the materials can be modified for different characteristics), and finally the agent must be prepared for delivery. Fortunately, stabilizing or weaponizing biological agents and disseminating them for maximum effect remain formidable technological challenges. There are three main types of organisms used in the production and transmission of the biological weapons. The first type is bacteria, which form to make many different diseases, some of which are the plague, leprosy, cholera, botulism, tetanus, and typhoid fever. The next type of biological weapon is the virus which is

much smaller than the bacteria cell. Unlike bacteria, the virus cannot reproduce or grow unless it is in a host. The last main type of agent that can be used for biological weapons is the prion (proteinaceous infectious particles). It is neither bacterial nor viral nor fungal and contains no genetic material. Although little is known about prions, we do know that infected proteins will enter the body and take normal proteins and modify them to adversely affect the brain and neurons.

Biological agents can be "silent killers." With effects not immediately noticeable because of gestation periods and delays involved in identifying the agent, these weapons have the capability to spread their effects through large segments of a population before they are discovered or classified. The inability to control the effects once released make biological weapons more likely to be used by nonstate groups interested in disrupting society than by nation states that would normally be concerned about infections spreading to their own populations.

Information on biological weapons programs is highly classified and generally unavailable outside the intelligence community. While no country in the world acknowledges the existence of any stockpiles of biological agents, several are believed to have biological weapons stockpiles and active research and development programs. These assessments are generally denied by the suspect countries, tend to be based on sketchy information, and cannot be verified through an independent verification regime.

Chemical Weapons

Following the extensive use of chlorine and mustard gas in WWI, the use of "asphyxiating, poisonous or other gases, and of bacteriological methods of warfare was banned under the Geneva Convention of 1925, but not the production or stockpiling of such weapons. The development of nerve agents in the 1920s and 1930s – significantly more deadly and difficult to defend against – gave chemical warfare a new lease of life. Despite the fact that all the belligerents in World War II elected not to employ chemical warfare agents, the U.S., United Kingdom, Soviet Union, and possibly up to a score of other states deployed arsenals of chemical warfare agents and advanced delivery systems after that war's conclusion.

The total declared stockpile of chemical weapons in the world was about 43,760 tons in early 2008. A total of 71,315 tons have been declared to Organization for the Prohibition of Chemical Weapons by six states parties to the Chemical Weapons Convention (Albania, India, Libya, Russia, an undeclared state party believed to be South Korea, and the U.S.) of which about 29,602 tons had been destroyed by Sept. 30, 2008. Albania completed the destruction of its stockpile in 2007 and South Korea completed the destruction of its stockpile in 2008. All known chemical weapons production facilities have been deactivated.

According to the CWC, all stockpiles were to have been destroyed by the end of 2007. However, due to a variety of difficulties, several countries have requested extensions to

complete the process. India is expected to be finished in April 2009 and Libya in December 31, 2011. Russian and the U.S. both have a deadline date of April 29, 2012, but neither country will finish its chemical weapons destruction by that date. Both are not expected to complete the destruction until some time after 2020. In addition, several other states are suspected to have undeclared stockpiles.

Radiological Weapons

Crude radiological dispersal devices (RDDs), or "dirty bombs," can be made by strapping explosive material to radioactive materials (radionuclides) commonly used in medical, industrial and agricultural applications. It should be noted, however, that only certain radioactive isotopes can be used for this purpose While the immediate destructive force would cause limited casualties, the psychological impact could cause havoc and massive societal disruption as a result of panic and the economic impact of large city areas rendered unusable pending intensive clean-up efforts could be enormous. There are no known stockpiles of such weapons and the most serious threat is probably the use by terrorists. The nuclear fuel and radioactive waste stored at nuclear power plants also present a potential WMD risk, both for use in RDDs but more likely as targets of attack by conventional weapons in order to spread radiation.

Safeguarding Dual-use Components and Materials

Many of the materials and components used to produce WMD also have legitimate civilian applications in medical, energy, and industrial fields. Such dual-use materials must be safeguarded against diversion for military purposes.

Uranium

Since German physicists discovered its energy properties in 1938, uranium has become the principle fuel component in the nuclear fuel cycle as well as an essential material used in the production of nuclear weapons. Natural uranium consists largely of the non-fissile isotope U-238, with only 0.7 percent of the radioactive isotope U-235. Uranium enrichment is the process whereby the percentage of U-235 is increased to the higher levels needed for use as fuel in reactors or for nuclear weapons. Some reactors run on natural uranium fuel (i.e., unenriched) but the most common nuclear power plants use uranium enriched to 3.5 to 5 percent in U-235. Enrichment can be accomplished in several ways; the most economical method is through the use of gas centrifuges.

Concentration of 20 percent U-235 is the accepted threshold between low enriched uranium (LEU) and highly enriched uranium (HEU). Although 20 percent HEU is theoretically weapons-usable, the necessary critical mass would be too large for practical use. In practice, the threshold for weapons grade HEU is considered to be 80 percent and the typical level of enrichment in deployed weapons is thought to be around 93-94 percent. The IAEA evaluates that 25kg of weapons-grade HEU (one critical mass) are required for an implosion-type weapon. Gun-type weapons (in which one subcritical quantity of uranium is fired into another) can use HEU of as low as 80 percent, as was the

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case with *Little Boy*, the weapon dropped on Hiroshima in 1945, but requires a larger mass. Naval reactors use HEU for ship propulsion, and approximately 135 research reactors in 40 countries run on HEU fuel. Due to the danger of HEU being diverted or stolen, the U.S., Russia, and the IAEA have been engaged for several years in efforts to convert these research reactors to run on LEU and to remove the fresh HEU. The *Little Boy* gun-barrel bomb design is the least demanding technologically making HEU of greater concern than plutonium in respect of acquisition by nonstate actors.

While efforts to reduce the usage and stockpiles of HEU continue, significant quantities of the material sill exist in national civilian stockpiles. The U.S. and Russia have stockpiles of over 10,000 kilograms according to the International Panel on Fissile Materials. It estimates that Canada, Japan, China, France, United Kingdom, and Germany possess approximately 1,000-10,000 kgs of HEU. Australia, Pakistan, India, several ASEAN member nations, and South American nations are believed to possess 1,000 kilograms or less. In total, most estimates show that more than 1,600 metric tons of HEU exist in global stockpiles. The challenge is to ensure adequate measures to ensure control of this material.

Plutonium

Plutonium is a man-made element, created by bombarding uranium with neutrons in a reactor, either as an unwanted byproduct of power generation for civilian purposes or as the intended product in a dedicated reactor. Estimates indicate there is more than 1,800 metric tons of plutonium in world stockpiles. The amount of plutonium required to reach critical mass is relatively small – 8 kg by the IAEA definition, but 5-6 kg or even less in practice. Even seemingly insignificant amounts of plutonium present a security threat.

Plutonium used in a nuclear weapon must be chemically separated, or "reprocessed," from the other materials and fusion products that make up the bulk of spent fuel. Reprocessing plutonium is a dangerous process that requires a heavily shielded facility. The International Panel of Fissile Materials estimates that the global stockpile of separated plutonium, all of which is weapon-usable, is about 500 tons. About half of this stockpile is civilian and continues to grow.

Biological Components

While relatively few or no biological weapons exist in national stockpiles, the threat still manifests itself in the components that are used to make biological weapons. It is difficult to characterize the threat from biological components because while materials and expertise for creating a bacteria or a virus are readily available, manufacturing them in large quantities and dispersing them over wide areas requires significant resources and sophisticated technology. Terrorists may use biological agents because they can create significant social disruption when deployed in relatively small quantities, they are extremely difficult to detect and some do not cause illness for several hours to several days. Some bioterrorism agents, like the smallpox virus, can be spread from person to person and some, like anthrax, can not.

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Chemical Components

Although national stockpiles of chemical weapons are being painstakingly destroyed, the threat still manifests itself in the components that are used to make chemical weapons. These components are known as toxic chemical precursors (TCPs), a variety of chemicals which when combined with other compounds create weapons such as sarin – the nerve agent used in the 1995 Aum Shinrikyo cult's attacks on the Tokyo subway which killed 12 people – and mustard gas. These TCPs are known to chemists as dual-use chemicals, which means they can be used in harmless industries like agriculture or turned into weapons of mass destruction when mixed with other chemicals.

Proliferation of Weapons of Mass destruction

Proliferation is generally defined as the spread of WMD and the corresponding technical knowledge. Most proliferation in the past has been state-to-state, but the rise of nuclear black-market networks, such as that led by Pakistani scientist A.Q. Khan until 2004, alerted the world to the new proliferation danger posed by nonstate actors. The emergence of international terrorism and the avowed intentions of Al Qaeda to acquire nuclear weapons heighten the proliferation threat.

WMD proliferation can manifest in four ways: proliferation of components and materials, proliferation of the weapons themselves, proliferation of delivery systems, and proliferation of technology and know-how. The nuclear nonproliferation regime has succeeded in limiting the number of states with nuclear weapons to nine to date. South Africa, Ukraine, Kazakhstan, and Belarus all gave up nuclear weapons while Argentina, Brazil, and Libya are among states to have voluntarily stopped their nuclear weapons programs. Yet the nuclear weapons tests conducted by India and Pakistan in 1998 and by North Korea in 2006 and the 2002 revelations of Iran's clandestine enrichment program have cast doubts regarding the effectiveness of the NPT regime. Withdrawal, circumvention, the threat of withdrawals, an increasingly dynamic security environment, and the increasing availability of sensitive technology all contribute to the challenges faced by the nonproliferation regime. Many states also express concern that the nonproliferation norm is weakened to the extent that the nuclear weapons states legitimized by the NPT have not taken further steps to meet the disarmament obligations posed by Article 6 of the Treaty.

Illicit Trafficking in WMD Materials

Trafficking of component materials used in the creation of WMD, particularly of nuclear weapons, is a serious concern. Since the early 1990s there has been a rise in the number of attempts to smuggle nuclear and other radioactive material. As of December 31, 2007, the IAEA Trafficking Data Base (ITDB) contained 1340 confirmed incidents reported by the participating states and a few nonparticipating states. Of the 1,340 confirmed incidents, 303 incidents involved unauthorized possession and related criminal activity, 390 incidents involved theft or loss of nuclear or other radioactive materials, and 570

incidents involved other unauthorized activities. For the remaining 77 incidents, the reported information was not sufficient to determine the category of incident. It is becoming increasingly difficult to gauge the amount of potentially lost material. The vast majority of incidents have occurred throughout Eastern Europe and the former Soviet Union, traceable to Russian nuclear installations. Most importantly, the majority of incidents tend to be related to insider theft by disgruntled workers who attempt to search for buyers using organized criminal networks.

The proliferation of chemical and biological weapons components also represents an inherent threat. Since chemical precursors and basic vaccines that form the basis for building chemical weapons and biological organisms are easily accessible and used by civilian medical and industrial services throughout the world, it is possible for rogue international actors to gain access to them through legitimate transactions. The limiting factor has been the lack of facilities needed to fabricate weapons from these components.

Proliferation of Delivery Systems

The technology and systems engineering associated with delivery systems is also becoming rapidly available. Traditional delivery systems such as ballistic missiles, cruise missiles, and Unmanned Aerial Vehicles, are now becoming more wide spread. At the same time, recognition must be given to WMDs employed without traditional delivery systems. For example, toxins or a parasite put into a water supply will asymmetrically deliver the WMD material to a wide array of targets.

Nonstate actors, specifically terrorist organizations, attempting to gain WMD technology are a major cause for concern. While the technical knowledge has been readily available for a long time, the primary concern is to ensure that nations work together to prevent the spread of fissile material, toxic agents, and harmful biological organisms, etc.

The Proliferation of Technology and Expertise

Accessibility to technical knowledge of WMD is growing. Mediums such as the Internet, and the advent of more states "going nuclear" for civilian or military purposes all spread the use and knowledge of WMD technology. Several stages in the technical processes of producing nuclear energy can be used for the purpose of developing weapons programs. This threat of the misuse of dual-use technology is acute. The spread of nuclear energy has become so widespread that a large number of commercial firms and countries possess and use nuclear technology. It is possible that this technology can fall into the hands of those wishing to use it for other than the prescribed civilian purposes.

Biological and chemical technology proliferation is also a serious threat. Dual-use technology is in extensive use in medical and industrial research labs throughout the world. Many harmful chemical and biological agents are developed for the sole purpose of developing antidotes or vaccines to protect against them. It is possible for a large multinational organization, rogue state, nonstate actor, or supranational individual to misuse dual-use technology for a more nefarious purpose. The problems with radiological

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weapons are akin to that of chemical and biological weapons. Radiological components are used in a wide variety of technologies throughout the world, and misuse of such technology is a serious global threat.

Another aspect of the proliferation of technology is through the diffusion of expertise or what has been described as the "know-how" proliferation threat. This was especially a concern in the 1990s after the Soviet Union dissolved in 1991 and tens of thousands of scientists, engineers, and technicians that comprised the backbone of the Soviets' unconventional weapons programs went from relative riches as an elite corps of patriots to highly skilled excess capacity residing in bloated weapons complexes throughout the region. Although most of these former Soviet workers have been absorbed in to the workforce, this worldwide excess capacity in WMD-related expertise continues to be a concern. Coupled with the large quantities of component materials available on the black market, the threat of this expertise being used by undesirable nonstate actors remains an important part of the proliferation threat.

It is imperative that all countries in the Asia-Pacific work in unison to defeat the threat. To ensure success against the threat dimensions posed by WMD, countries must adopt a multi-layered defense. Containing the threat posed by the presence of WMD and the proliferation of both the weapons and their components is in the interest of all countries and responsible international actors.

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Chapter 3
Global Nonproliferation Treaties and Conventions

The purpose of this chapter is to provide a summary of the major treaties and the organizations that form the basis for the global nonproliferation regime. These agreements are open to all states and are legally binding on acceding parties. There is a separate treaty to address nuclear, biological, and chemical weapons. Each treaty has different requirements for elimination of weapons, compliance verification, and national implementation of the disarmament and nonproliferation regimes. These differences reflect the characteristics of the materials used in the weapons, the political will to address compliance and verification issues at the time these treaties were developed, and the inherent difficulties in establishing international governance mechanisms that deal with disarmament and the trade of strategic materials.

The 1968 Nuclear Non-Proliferation Treaty (NPT) does not prohibit states from maintaining materials used for nuclear weapons and does not explicitly require states Parties to adopt national implementation measures to give effect to the treaty. It does require states to enter into nuclear safeguards agreements with the International Atomic Energy Agency (IAEA), which has promulgated non-binding guidelines for national measures to protect nuclear materials and equipment from security breaches. There are also subsequent UN agreements that require compliance by states parties to several additional restrictions in their handling of nuclear materials. These agreements are covered separately in Chapter 4 of this handbook.

The 1972 Biological Weapons Convention (BWC) prohibits states from maintaining biological weapons in any form and requires them to take “any necessary measures” in accordance with their constitutional processes to implement the treaty prohibitions. This necessitates that states parties must establish national export control regimes for potential bio-warfare agents, related materiel and delivery systems. While the treaty leaves the form of national implementation measures to states parties, the scope of obligations they must cover is clear: comprehensive measures are necessary to ensure compliance.

The 1993 Chemical Weapons Convention (CWC) requires the dismantlement of all existing chemical weapons and contains the most detailed national implementation provision of the three major agreements addressed in this chapter. In contrast to the BWC, it explicitly requires states parties to adopt criminal legislation for activities that violate the treaty and to extend these measures to offenses committed by their citizens outside of their territory. National laws are also necessary to establish and operate the National Authority required under the CWC. The prohibitions in the BWC and CWC apply equally to states and nonstate actors, while the NPT allows nuclear-weapon states recognized by the treaty to maintain nuclear weapons stockpiles during negotiations on nuclear disarmament.

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1. Nuclear Nonproliferation Treaty (NPT)

a. General Information

Title:	Treaty on the Nonproliferation of Nuclear Weapons
Opened for Signature:	1 July 1968
Number of Parties:	191
Number of Signatories:	92
Status:	Entered into force on 5 March 1970
Inspection/verification:	Yes

Additional information:
http://www.iaea.org/Publications/Documents/Infcircs/Others/infcirc140.pdf

The NPT is a treaty to limit the spread of nuclear weapons that recognizes five nuclear weapons states: the United States, the United Kingdom, France, Russia, and the People's Republic of China (the permanent members of the UN Security Council). The treaty was proposed by Ireland, and Finland was the first to sign. The signing parties decided by consensus to extend the treaty indefinitely and without conditions upon meeting in New York City in 1995. However, the agreement requires that review conferences be held every five years to assess implementation of the Treaty. The next conference is scheduled to be held in 2010.

The NPT consists of a preamble and eleven articles. Although the concept of "pillars" appears nowhere in the NPT, the treaty is nevertheless sometimes interpreted as having three pillars: non-proliferation, disarmament, and the right to use nuclear technology for peaceful purposes. Under the first pillar, the five nuclear weapons states (NWS) agree not to transfer "nuclear weapons or other nuclear explosive devices and "not in any way to assist, encourage, or induce" a non-nuclear weapon state (NNWS) to acquire nuclear weapons (Article 1). NNWS parties to the NPT agree not to "receive, manufacture or acquire" nuclear weapons or to "seek or receive any assistance in the manufacture of nuclear weapons" (Article 2). NNWS parties also agree to accept safeguards by the International Atomic Energy Agency (IAEA) to verify that they are not diverting nuclear energy from peaceful uses to nuclear weapons or other nuclear explosives devices (Article 3).

The disarmament pillar has been a source of friction among states. The NPT's preamble contains language affirming the desire to ease international tension and strengthen international trust in the hope of eliminating nuclear weapons and delivery vehicles from national arsenals. Article 4 elaborates on the preamble's language. On the one hand, it

arguably imposes only a vague obligation on all NPT signatories to move in the general direction of nuclear and total disarmament, saying, "Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament." Under this interpretation, Article 6 does not strictly require all signatories to actually conclude a disarmament agreement. On the other hand, some governments, especially NNWS, have interpreted the language of Article 6 as constituting a formal and specific obligation for the NWS to disarm themselves of nuclear weapons, and argue that these states have failed to meet their obligation.

The third pillar allows for and agrees upon the transfer of nuclear technology and materials to NPT signatory countries for the development of civilian nuclear energy programs in those countries, as long as they can demonstrate that their nuclear programs are not being used for the development of nuclear weapons. The treaty recognizes the inalienable right of sovereign states to use nuclear energy for peaceful purposes, but restricts this right for NPT parties to be exercised "in conformity with Articles 1 and 2."

b. Participation in the NPT by States in the Asia-Pacific

Only four recognized sovereign states are not parties to the treaty: India, Israel, Pakistan and North Korea. India and Pakistan both possess and have openly tested nuclear bombs. Israel has had a policy of opacity regarding its own nuclear weapons program. North Korea acceded to the treaty in 1985, violated it, suspended it membership, and later withdrew in 2003. All other states in East Asia have ratified the treaty.

Specific information regarding individual country status with the NPT is provided at: http://disarmament.un.org/TreatyStatus.nsf

c. Organizational Aspects of the NPT

The IAEA serves as the verification authority for safeguards agreements mandated in Article 3 of the NPT. The states parties have an obligation to declare to the IAEA all nuclear material and facilities subject to safeguards. The states also have an obligation to update this information and to declare all new nuclear materials and facilities which subsequently become subject to the terms of the agreement. Violations noted in the process of verification are reported to the UN Security Council, which is ultimately responsible for taking NPT enforcement action.

The UN Office of Disarmament Affairs (UNODA) plays an important role in implementation of the NPT by promoting the goals and strengthening the regimes of nuclear disarmament and non-proliferation. UNODA also provides substantive and organizational support for norm-setting in the area of disarmament through the work of the General Assembly and its First Committee, the Disarmament Commission, the Conference on Disarmament and other bodies.

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2. Biological and Toxin Weapons Convention (BTWC/ BWC)

a. General Information

Opened for Signature: 10 April 1972

Number of Parties: 161

Number of Signatories: 108

Status: Entered into force on 26 March 1975

Inspection / Verification: No

Additional information: http://www.opbw.org.

The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction – more commonly known as the Biological and Toxin Weapons Convention (BTWC) – bans the development, production, stockpiling, acquisition and retention of microbial or other biological agents or toxins, in types and in quantities that have no justification for prophylactic, protective or other peaceful purposes. It also bans weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict. The actual use of biological weapons is prohibited by the 1925 Geneva Protocol and Article 8 of the BTWC recognizes that nothing contained in the Convention shall be construed as derogation from the obligations contained in the Geneva Protocol.

Article 1 defines the scope of the BTWC's prohibition (the so-called general purpose criterion) as being all microbial and other biological agents or toxins and their means of delivery. Subsequent Review Conferences have reaffirmed that the general purpose criterion encompasses all future scientific and technological developments relevant to the Convention. The objects themselves (biological agents or toxins) are not prohibited, only their purpose. Permitted purposes are defined as prophylactic, protective and other peaceful purposes. The objects may not be retained in quantities that have no justification or which are inconsistent with the permitted purposes.

Article 2 requires each state party to destroy or divert to peaceful purposes all agents, toxins, weapons, equipment and means of delivery specified in Article 1 no later than nine months after the Convention is entered into force.

Article 3 prohibits states parties from transferring or otherwise encouraging other states or organizations to acquire any of the agents, toxins, weapons, equipment or means of delivery specified in Article 1.

Article 4 requires states parties to take any necessary national measures (e.g., passage of national laws) to prohibit and prevent the misuse of biological agents, toxins, weapons,

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equipment and means of delivery within their territories. Only a small number of states Parties have implemented this provision.

In Article 5, states parties undertake to consult with one another and to cooperate in solving any problems that may arise in relation to the Convention.

Under Article 6, any state party finding another state acting in breach of the Convention may lodge a complaint with the United Nations Security Council. States parties will cooperate in carrying out any investigation the Security Council may initiate on the basis of the complaint. The Security Council will inform states parties of the results of the investigation.

In Article 7, states parties undertake, if requested, to assist any party which the Security Council decides has been exposed to danger as a result of violation of the Convention.

Article 8 stipulates that nothing in the Convention shall in any way limit or detract from obligations assumed under the Geneva Protocol.

In Article 10, states parties undertake to facilitate the fullest possible exchange of equipment, materials and scientific and technological information for the use of biological agents and toxins for peaceful purposes.

In Article 12, provision is made for a conference of states parties to the Convention to review the operation of the Convention, with a view to assuring that the purposes of the preamble and the provisions of the Convention, including the provisions concerning negotiations on chemical weapons, are being realized.

The Biological and Toxin Weapons Convention was the first multilateral disarmament treaty to ban an entire category of weapons. Based on a decision made at the Fifth Review Conference (RevCon) in 2002, there are now annual, one-week meetings of states parties (MSPs) in the years between RevCons, which take place approximately every five years. Each of these 'intercessional' MSPs is immediately preceded by a one-week meeting of experts.

At the Sixth RevCon (2006), states parties agreed to a set of specific actions to strengthen the implementation of the BTWC. These included:

- establishing national BTWC contact points;
- reporting on national measures to implement the BTWC;
- responding to an Iranian proposal to amend the Convention to explicitly prohibit the *use* of biological and toxin weapons;
- annual reporting on the implementation of Confidence-Building Measures (CBMs) agreed to in 1986 and updated in 1991;

- reporting on whether member states required or could provide assistance to other states parties in the areas of CBMs, national implementation, or biosafety and biosecurity measures;
- working to obtain the universality of the BTWC.

b. Participation in the BTWC by States in the Asia-Pacific

Most states in the Asia Pacific region have signed and ratified/acceded to the Convention. Cook Islands, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru Niue, Samoa, and Tuvalu are non signatories. Myanmar has signed, but not yet acceded.

Specific information regarding the status of individual states is provided at: http://disarmament.un.org/TreatyStatus.nsf

c. Significant Reservations to the BTWC / Explanations of Accession

Significant issues identified in the reservations declarations and explanations of accession to the BWC center on matters of neutrality, commitments of assistance, strength and effectiveness of the BWC and the possibility of retaining the right of retaliation.

Austria in a reservation upon ratification (10 August 1973) referred to limits on the obligations in the BWC, in particular Article 7 where Parties to the Convention "each state party to this Convention undertakes to provide or support assistance, in accordance with the United Nations Charter, to any party to the Convention which so requests, if the Security Council decides that such party has been exposed to danger as a result of violation of the Convention." The limits are determined by "the status of permanent neutrality and membership with the United Nations." India in a statement upon signature (15 January 1973) reiterates that assistance must be in conformity with the Charter of the United Nations, and states that any assistance which might be furnished under the terms of the Convention, would be of medical or humanitarian nature

China in a statement upon ratification (15 November 1984) raised a number of issues concerning the lack of explicit terms in the Convention including reference to concrete and effective measures for the supervision and verification of biological weapons and forceful measures or sanctions for violations. India expressed concern that these will be addressed at an appropriate time. It hoped that a more extensive convention on complete prohibition and thorough destruction will be completed.

India identified the inseparable link between the BWC and the CWC as part of WMD security as a whole. This point was reiterated by China. Additionally, India cautioned that R&D on biological agents or toxins for legitimate defensive purposes should not be construed as a "loophole in regard to the production or retention of biological and toxic weapons."

Ireland in a declaration upon signature (10 April 1972) withdrew their reservations to the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases, and of Bacteriological Methods of Warfare, 1925, as the BWC strengthened the provision of this protocol. Ireland's reservations referred to the issue of whether Ireland was bound by the protocol if an opposing state failed to respect the provisions of the protocol. It was found that that the BWC would be undermined by these reservations as the "prohibition of possession is incompatible with the right to retaliate."

d. Organizational Aspects of the BTWC

The BTWC relies on states parties to develop national measures to prohibit and prevent the misuse of biological agents, toxins, and weapons. The Convention charges the UN Security Council with the responsibility to investigate violations brought to its attention by a state party to the Convention. The absence of formal external verification or enforcement mechanisms seriously limits the effectiveness of the BTWC. From 1994-2001, efforts by a specially mandated Ad Hoc Group to negotiate a legally binding verification protocol proved unsuccessful.

In an important step in the institutionalization process of the BTWC, the 2006 Review Conference established an Implementation Support Unit (ISU) to facilitate, collect and correlate data, and report on the implementation activities of states parties. The ISU is located within the Geneva Branch of the United Nations Office for Disarmament Affairs and has a permanent staff of three.

The UN Office of Disarmament Affairs (UNODA) plays an important role in implementation of the BTWC by providing substantive and organizational support for norm-setting in the area of disarmament through the work of the General Assembly and its First Committee, the Disarmament Commission, the Conference on Disarmament and other bodies.

3. Chemical Weapons Convention (CWC)

a. General Information

Opened for Signature:	13 January 1993
Number of Parties:	185
Number of Signatories:	165
Status:	Entered into force on 29 April 1997 following ratification by 65 signatories
Inspection / Verification:	Yes
Additional information:	http://www.opcw.org.

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The Chemical Weapons Convention bans the development, production, stockpiling, transfer and use of chemical weapons and provides for their destruction within stipulated deadlines. states parties to the CWC undertake not to engage or assist anyone to engage in activity prohibited under the Convention and have an obligation to assist other states parties who are threatened by, or who have suffered, chemical attack.

The CWC defines chemical weapons as toxic chemicals and their precursors (aside from types and quantities of such agents consistent with and intended for peaceful applications); munitions and devices specifically designed to cause death or harm through the release of such agents; and any equipment designed specifically for use with such munitions or devices.

The convention distinguishes three classes of controlled substance, chemicals which can either be used as weapons themselves or used in the manufacture of weapons. The classification is based on the quantities of the substance produced commercially for legitimate purposes. Each class is split into Part A, which are chemicals that can be used directly as weapons, and Part B which are chemicals useful in the manufacture of chemical weapons.

- Schedule 1 chemicals have few, or no uses outside of chemical weapons. These may be produced or used for research, medical, pharmaceutical or chemical weapon defense testing purposes but production above 100 grams per year must be declared to the Organization for the Prohibition of Chemical Weapons (OPCW). A country is limited to possessing a maximum of 1 ton of these materials. Examples are mustard and nerve agents, and substances which are solely used as precursor chemicals in their manufacture. A few of these chemicals have very small scale non-military applications, for example minute quantities of nitrogen mustard are used to treat certain cancers.

- Schedule 2 chemicals have legitimate small-scale applications. Manufacture must be declared and there are restrictions on export to countries which are not CWC signatories. An example is thiodiglycol which can be used in the manufacture of mustard agents, but is also used as a solvent in inks.

- Schedule 3 chemicals have large-scale uses apart from chemical weapons. Plants which manufacture more than 30 tons per year must be declared and can be inspected, and there are restrictions on export to countries which are not CWC signatories. Examples of these substances are phosgene, which has been used as a chemical weapon but which is also a precursor in the manufacture of many legitimate organic compounds and triethanolamine, used in the manufacture of nitrogen mustard but also commonly used in toiletries and detergents.

The Convention also deals with carbon compounds called in the treaty *Discrete organic chemicals*. These are any carbon compounds apart from long chain polymers, oxides, sulfides and metal carbonates, such as organophosphates. The OPCW must be informed

of, and can inspect, any plant producing (or expecting to produce) more than 200 tons per year, or 30 tons if the chemical contains phosphorus, sulfur or fluorine, unless the plant solely produces explosives or hydrocarbons.

b. Participation in the CWC by States in the Asia-Pacific

All countries in the Asia Pacific have signed and ratified/acceded to the CWC except North Korea and Myanmar. North Korea has neither signed nor ratified the Convention and Myanmar has signed but not ratified. Specific information regarding the status of individual states is provided at: http://www.opcw.org/about-opcw/member-states/

c. Significant CWC Reservations & Declarations

Significant issues identified in the reservations and declarations to the CWC center on matters of universality, verification, abandoned weapons, trade and export controls.
In a declaration upon signature (13 January 1993) and upon ratification (25 April 1997), China referred to the need for the countries with the largest chemical weapons arsenals to ratify the convention so as to increase the universality of the treaty and to attain the conventions purposes and objectives at an early date.

China also referred to the challenges facing verification systems, specifically the Article 9 provision for challenge inspections, stating that potential abuse would have a detrimental effect on 'the security interests of states parties unrelated to chemical weapons' and on state sovereignty. As a result China suggests that this would adversely affect the universality of the Convention. Challenge inspections allow state parties to request the OPCW Secretariat to conduct an on-site challenge inspection anywhere in the territory (or under the jurisdiction or control) of any other state party in order to clarify and resolve any questions concerning possible non-compliance with the CWC.
Reference was made to states parties who have abandoned chemical weapons on the territories of other states parties and the necessity to implement the relevant provisions of the Convention and undertake the obligation to destroy the abandoned chemical weapons.

Additionally, China reaffirmed the Conventions role in promoting international trade, scientific and technological exchanges and operation for peaceful purposes in the field of chemical industry. The convention should "become an effective legal basis to regulate trade and exchange among the state parties in the field of chemical industry." To do this export controls that are inconsistent with the convention should be abolished.

The United States in a reservation upon ratification (25 April 1997) stated that analysis of samples collected in the United States pursuant to the Convention cannot be transferred for analysis outside the territory of the United States. As a consequence, verification and the effective implementation of the Convention rely on the states parties' capacity to regulate themselves.

d. Organizational Aspects of the CWC

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Unlike the BTWC, the CWC has a comprehensive mechanism, in the form of the OPCW, for verifying the compliance of states parties with their obligations under the Convention. Membership of the OPCW comprises all states parties to the CWC plus a Technical Secretariat, The Secretariat is responsible for the day-to-day administration and implementation of the Convention, including inspections mandated to monitor and verify the deactivation, then the destruction or conversion, of all declared chemical weapons production facilities and stockpiles.

The Executive Council and the Conference of the states parties are decision-making organs of OPCW designed primarily to determine questions of policy and resolve matters arising between the states parties on technical issues or on interpretations of the Convention. The Conference of the states parties is the plenary organ consisting of all members of the OPCW and has the general power to oversee the implementation of the Convention. The Executive Council consists of 41 members who are elected by the Conference. The Convention requires that, in order to ensure the Council's effectiveness, it is constituted with due regard to the principle of equitable geographical distribution, the importance of the chemical industry, and political and security interests. It is required to carry out all functions and powers entrusted to it by the Convention, as well as any functions delegated to it by the Conference to include submitting recommendations for action to be taken by the Conference in cases of non-compliance by a state party. It is also required to supervise the activities of the Secretariat, to cooperate with the National Authority of each state party, and to facilitate consultations with and cooperation among states parties, at their request.

The chairs of the Executive Council and the Conference are appointed by each body's membership. The Technical Secretariat is headed by a Director-General, who is appointed by the Conference on the recommendation of the Council.

CWC Members must designate or establish a National Authority as a point of contact for the Secretariat and other states parties. These National Authorities are tasked with implementing the CWC effectively at the national level and are obliged to report annually to the OPCW on progress in this regard. They also foster the development and sharing of chemistry for peaceful purposes.

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Chapter 4
Global Nonproliferation Regime Compliance Mechanisms

This chapter addresses compliance mechanisms associated with the global nonproliferation regime. These mechanisms have been developed over the years in response to specific concerns with different aspects of the threat from weapons of mass destruction (WMD), component materials, and radioactive waste. The mechanisms described in this chapter are open to all states and are considered multilateral in the sense that they are intended to be universally applicable with individual states acceding to and complying with the provisions of the specific agreement.

The compliance mechanisms are divided into four categories: weapons of mass destruction, nuclear materials, radiological materials, and weapons and test bans. UN Security Council Resolution 1540 is unique in that it is the only compliance mechanism that pertains to all types of WMD and addresses a specific concern with the international security risk associated with undesirable nonstate actors acquiring WMD.

Nuclear materials are the key ingredients in nuclear weapons. They include fissile, fussionable, and source materials. Fissile materials are those which are composed of atoms that can be split by neutrons in a self-sustaining chain-reaction to release energy, and include plutonium-239 and uranium-235. Fussionable materials are those in which the atoms can be fused in order to release energy, and include deuterium and tritium. Source materials are those which are used to boost nuclear weapons by providing a source of additional atomic particles for fission. They include tritium, polonium, beryllium, lithium-6 and helium-3.

Radioactive material is another category that has drawn attention in several compliance mechanisms. It is defined as material that contains unstable (radioactive) atoms that give off ionizing radiation as they decay. Although most of the treaties associated with radioactive material are concerned with health and safety issues associated with these materials, there is growing recognition that these materials also present a growing proliferation risk in that they can be utilized to manufacture so called “dirty bombs.”

A final category of compliance mechanisms is nuclear weapons test bans. The early efforts were led by the nuclear powers. In accepting limitations on testing, the nuclear powers accepted as a common goal “an end to the contamination of the environment by radioactive substances.” Efforts to achieve a test ban agreement involved complex technical problems of verification and the difficulties of reconciling deep-seated differences in approach to arms control and security. The uneven progress of the negotiations also reflected fluctuations in East-West political relationships.

As knowledge of the nature and effects of fallout increased, and as it became apparent that no region would be untouched by radioactive debris, the issue of continued nuclear tests drew increased public attention. Apprehension was expressed about the possibility of a cumulative contamination of the environment and of resultant genetic damage.

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1. Weapons of Mass Destruction

1.1 United Nations Security Council Resolution 1540 (2004)

a. General Information

Date of adoption: 28 April 2004

Related resolutions: Resolution 1673 (2006) adopted on 27 April 2006
Resolution 1810 (2008) adopted on 25 April 2008

Additional information: http://www.un.org/sc/1540/index.shtml.

United Nations Security Council Resolution 1540 (2004) adopted under Chapter 7 of the United Nations Charter puts into place an overarching structure that addresses the international security risks associated with weapons of mass destruction (WMD) and the acquisition of these weapons by nonstate actors. It brings together a wide range of initiatives into a universally applicable regime. The resolution places comprehensive obligations on states aiming to harmonize the implementation of previously separate agreements relating to WMD and obliges states to recognise these agreements in national legislation. It acknowledges that the acquisition of WMD by nonstate actors and the illicit trafficking of WMD, their means of delivery, and related materials is one of the most significant threats to international peace and security.

This resolution fills existing gaps in both the non-proliferation and counterterrorism regimes by placing responsibility on states and at the same time directing attention to the role of nonstate actors. The use of Chapter 7 authority means that the resolution is not only legally binding, but also enforceable through the punitive measures available to the Security Council.

Resolution 1540 places emphasis on state implementation and compliance with the resolution's obligations. A UN Security Council (UNSC) Committee monitors the implementation of this resolution by receiving state reports, requesting additional information and reporting these findings to the Security Council. Resolution 1673 (2006) extended the mandate of the Committee. This was reaffirmed by the Security Council in Resolution 1810 (2008) until 2011.

Compliance with this resolution is problematic as the obligations are comprehensive. The obligations of the resolution are organized into 10 operative paragraphs and include reporting requirements, national implementation, the effectiveness of national legislation, enforcement mechanisms, assisting other states in implementing the resolution, and promoting the aims of multilateral security. Operative paragraph four required a first report to be submitted by the 28th of October, 2004 outlining actions states have taken and actions intended. Of the 192 states, 59 met this deadline and a total of 153 states have currently submitted a first report. A large part of the problem with compliance results from a reliance on the states to comply fully with the requirements. The patterns of

reporting and non-submission indicate that noncompliance is associated with a lack of physical capacity to implement the measures required, a misunderstanding of the depth of these requirements, and insufficient political will to complete the required actions. The delay and gaps in reporting can be attributed to time-consuming administrative processes involved in filing reports and conflicts in priority where these security concerns conflict with economic or basic needs.

The UNSC 1540 Committee has requested additional information from all submitting states, 106 states have so far complied. To aid state reporting and implementation, the 1540 Committee has provided states with a matrix template (available at the UNSCR Committee website shown above) that clearly breaks down the obligations of the resolution. This matrix follows the operational paragraphs of the resolution. The revised implementation matrix, consisting of 382 fields, was applied to all national reports, and allows the Committee to assess the levels of reporting. However, it is not a tool for ensuring full compliance in that it does not provide for an evaluation of implementation measures. Additionally, the creation of a legislative database by the Committee provides a model for implementation and identifies best practice standards.

Operative paragraph 7 obliges able states to recognise the problems with compliance and offer assistance, and allows those states that require assistance to request it. It is understood by the Committee that technical assistance for implementing the provisions of Resolution 1540 is a long term issue, given the comprehensive depth of requirements and political issues. The resolution requires that states outline in their reports offers of assistance, details of assistance measures in place and point of contact details to facilitate the accommodation of requests. Assistance offers have also been made by a number of international organizations and other relevant arrangements, which can be viewed on the 1540 Committee website listed above.

b. Compliance with UNSCR 1540 by States in the Asia-Pacific

As a region, Asia is considered a high risk for WMD proliferation due to the expansion of nuclear energy and research, the production and storage of hazardous chemicals, the location of busy transshipment points, and the existence of known terrorist organizations. The Pacific on the other hand, is generally considered as low risk, due to the small population, lack of facilities, capacity and minimal use of restricted materials in the health and industrial sectors. Significant problems arise when tailoring the requirements of Resolution 1540 to each national context. However, it is a reality of the international security environment that the domestic policies of both Asia and the South Pacific are in fact integral to the global implementation of Resolution 1540. There is still much work to be done in these regions to achieve effective compliance including the submission of initial reports from the Cook Islands, North Korea (DPRK), Micronesia, Niue, Solomon Islands, and Timor Leste. Further, the 1540 Committee has requested additional information from several states in the region.

Specific information on submission dates by individual states is available at:
http://www.un.org/sc/1540/nationalreports.shtml

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2. Nuclear Materials

2.1 Comprehensive Safeguards Agreements (CSA), Additional Protocol (AP) and Small Quantities Protocol (SQP)

a. General Information

Date established:	Comprehensive Safeguards in 1968 Additional Protocol in 1997 Small Quantities Protocol in 1971 with modification in 2005
Verification/Inspection:	Yes
Additional information:	http://www.iaea.org/OurWork/SV/Safeguards/sv.html.
SQP Text:	http://ola.iaea.org/OLA/documents/ginf276mod1.pdf.

A Comprehensive Safeguards Agreement is a contract developed on an individual basis between the International Atomic Energy Agency (IAEA) and the state concerned. The basic purpose of the Agreement is to demonstrate compliance with article 3 of the NPT by allowing the IAEA to confirm accountability of all fissionable material used in peaceful nuclear activities within the state's territory, under its jurisdiction or carried out under its control anywhere. It is a means of verifying and assuring that such materials and technologies are solely for peaceful purposes and that they are not diverted to the production of nuclear weapons or other nuclear explosive devices. A rigid system of safeguards is essential to ensure peaceful nuclear programs are not, and do not become, weapons capable.

A significant loophole in the original CSA arrangement that became apparent in the early 1990s was that it depended on the contracting state to declare the facilities where the CSA should be applied. This allowed states to maintain "undeclared facilities" outside the reach of the IAEA verification program. To address the loophole the IAEA developed a formal expansion of its legal mandate in the form of an Additional Protocol (AP) to be adopted by member states to supplement their existing CSAs.

Although the AP applies only to states that already have a CSA in place, it is a separate agreement between individual states and the IAEA. The AP essentially reshapes the IAEA's safeguards regime from a quantitative system focused on accounting for known quantities of materials and monitoring declared activities to a qualitative system that gathers a comprehensive picture of a state's nuclear and nuclear-related activities, including imports and exports. It substantially expands the IAEA's ability to check for clandestine nuclear facilities by providing the agency with authority to visit any facility – declared or not – to investigate questions or inconsistencies in the state's nuclear declarations. In practice, it strengthens the original CSA regime and improves its efficiency by granting the IAEA greater access including short-notice inspections of all

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buildings on a nuclear site, collection of samples from sites beyond those declared by the state, information on the state's entire nuclear fuel cycle, and information about the manufacture and export of sensitive nuclear-related technologies.

The Small Quantities Protocol (SQP) is an addition to the framework created by the Comprehensive Safeguards Agreement. The SQP was set up for states that have minimal or no nuclear activities and it is essentially a declaration of this limited activity. Thus, they do not require the strict system of reporting and obligations that the CSAs involve. The implementation of the measures in Part II of the CSA, including reporting, inspection and verification come into effect when the quantity of nuclear material held by the state which is subject to safeguards exceeds the limits set by the SQP.

In 2005, the IAEA Board of Governors approved the modified text of an SQP, which reduces the number of measures held in abeyance for states with minimal or no nuclear activity and makes an SQP unavailable to a state with an existing or planned nuclear facility. This Protocol is an agreement between individual states and the IAEA.

b. CSA, AP and SQP Status in the Asia-Pacific

Most states in the region have concluded a CSA with the IAEA. Only three Pacific Island States (Cook Islands, Micronesia, and Niue) have not completed one.

There are several states that have not concluded an Additional Protocol Agreement including Brunei, Cambodia, Laos, and Myanmar in Southeast Asia, North Korea, and India. Additionally, several of the Pacific Island States have not concluded an AP Agreement with the IAEA, however, all except the Marshall Islands, Micronesia, and Vanuatu have concluded a SQP with the IAEA.

Specific information on submission dates by individual states is available at:
http://www.iaea.org/OurWork/SV/Safeguards/sir_table.pdf

2.2 Convention on the Physical Protection of Nuclear Material (CPPNM) and Amendment

a. General Information

Opened for Signature:	3 March 1980
Number of Parties:	139
Number of Signatories:	45
Status:	Entered into force 8 February 1987
Inspection / Verification:	No

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Additional information:
http://www.iaea.org/Publications/Documents/Conventions/cppnm.html.

The Convention on the Physical Protection of Nuclear Material is the only legally binding undertaking dealing with the physical protection of nuclear materials. It was established to implement measures related to the prevention, detection and punishment of offenses relating to such materials following the Non-Proliferation Treaty review conference of 1975 and the passage of the Nuclear Non-Proliferation Act by the U.S. in 1978. It provides a framework for international cooperation against the theft or unauthorized diversion of nuclear materials from civilian to military programs and obliges CPPNM member states to ensure the physical protection of nuclear material during international transit.

The Convention was amended in 2005, with the updated version creating a legal obligation for states parties to protect peaceful nuclear facilities and material in domestic use, storage and transit. It also provides for expanded cooperation between and among states parties regarding rapid measures to locate and recover stolen or smuggled nuclear material, mitigate any radiological consequences of sabotage, and prevent and combat related offenses. The amendment will take effect when two-thirds of the states parties to the Convention have ratified it (91 of the current 136 states parties). As of July 2008, 17 states have ratified the amended Convention.

b. CPPNM Status in the Asia- Pacific

There are several states in the Asia Pacific that have not signed the CPPNM including Brunei, Laos, Malaysia, Myanmar, North Korea, Singapore, Thailand, Timor Leste, and Vietnam. Also several Pacific Island States have not signed the convention including the Cook Islands, Micronesia, Niue, Papua New Guinea, Samoa, Solomon Islands, Tuvalu, and Vanuatu. Specific information on submission dates and instruments of deposit by individual states is available at:
http://www.iaea.org/Publications/Documents/Conventions/cppnm_status.pdf

c. Significant Reservations and Declarations

Reservations to the Convention are allowable under Article 17(3).

The significant reservations to the CPPNM are focused on disputes settlement, criteria of criminalizing actions under Article 7 and government jurisdiction over criminal actions of Article 7.

China, EURATOM, France, India, Indonesian and Korea (Rep. of) declare exemption to Article 17.2; jurisdiction of the International Court of Justice in the matter of unresolved disputes. In such cases a Party can request the President of the International Court of Justice or the United Nations Secretary-General as an arbiter.

EURATOM expressed reservations towards Articles7-13 and France to Articles 7 and 8. Article 7 defines a number of acts or attempted acts that could be criminalized; such acts

include (but are not limited to) robbery or theft of nuclear material, a threat, or act without lawful authority. Article 8 requires government to establish jurisdiction over such criminal acts. Articles 9-13 set out the procedures for expediency of trials and international assistance in criminal proceedings.

2.3 Convention on Nuclear Safety (CNS)

a. General Information

Opened for Signature: 20 September 1994

Number of Parties: 63

Number of Signatories: 65

Status: Entered into force 24 October 1996

Inspection/Verification: Yes

Additional information:
http://www.iaea.org/Publications/Documents/Conventions/nukesafety.html.

The Convention on Nuclear Safety was adopted in Vienna on 17 June 1994. The purpose of the Convention is to legally commit participating states operating land-based nuclear power plants to maintain a high level of safety. The obligations are based largely on the IAEA document entitled *The Safety of Nuclear Installations*. The Convention is incentives based, focusing on the common interest to achieve higher levels of safety, to be developed and promoted through regular meetings of the parties. The key obligations require the parties to submit reports on the implementation of their obligations for peer review at these meetings.

Original interest in development of the Convention stemmed from concern over older Soviet-designed power reactors that presented a greater safety risk than reactors of more recent design. Members are required to take appropriate safety precautions covered by the Convention in relation to siting, design, construction, operation, availability of adequate financial and human resources, assessment and verification of safety, quality assurance, and emergency preparedness. The Convention applies only to civilian nuclear power facilities, which pose the greatest safety risk because of the magnitude of stored energy and the inventory of radioactive isotopes. Members must submit reports on the implementation of their obligations for "peer review" at meetings held at the IAEA.

b. CNS Status in the Asia-Pacific

Many countries in the Asia Pacific region have acceded to or ratified the CNS. Those not signing include Brunei, Cambodia, Laos, Malaysia, Mongolia, Myanmar, New Zealand, North Korea, Thailand, Timor Leste, and Vietnam. None of the Pacific Island States

(Cook Islands, Fiji, Kiribati, Marshall Islands, Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu) have signed the CNS.

Specific information on submission dates by individual states is available at: http://www.iaea.org/Publications/Documents/Conventions/nukesafety_status.pdf

c. Significant Reservations and Declarations

India made a reservation upon signature that the Convention should cover all nuclear power plants, civil and military. It was Indian government's suggestion that the safety aspects of nuclear power plants would apply to the military domain.

2.4 International Convention on the Suppression of Acts of Nuclear Terrorism (NTC)

a. General Information

Opened for Signature:	14 September 2005
Number of Parties:	52
Number of Signatories:	115
Status:	Entered into force 7 July 2007
Inspection/verification:	No
Additional information:	http://treaties.un.org/doc/Treaties/2005/04/20050413%2004-02%20PM/Ch_XVIII_15p.pdf

The International Convention for the Suppression of Nuclear Terrorism, also known as the *Nuclear Terrorism Convention* (NTC), was adopted by consensus by the United Nations General Assembly on April 3, 2005 in response to international concern about the worldwide escalation of acts of terrorism in all its forms. The Convention obliges states to create legislation criminalizing acts of terrorism, to investigate alleged terrorist offenses and to arrest, prosecute or extradite offenders as appropriate. It also obliges states parties to cooperate with the investigations of other states parties through information sharing. The NTC provides definitions for acts of nuclear terrorism, including a broad range of related materials and possible targets including radioactive and nuclear material, enriched uranium, and nuclear reactors and power plants.

The idea for a Convention on the suppression of acts of nuclear terrorism originated in the 1990s in the wake of growing concerns about the threat of terrorists using nuclear or radiological material. In 1996, the United Nations (UN) General Assembly established an

Ad Hoc Committee with a mandate "to elaborate an international convention for the suppression of terrorist bombings and, subsequently, an international convention for the suppression of acts of nuclear terrorism, to supplement related existing international instruments, and thereafter to address means of further developing a comprehensive legal framework of conventions dealing with international terrorism. The Convention represents the first anti-terrorism treaty adopted after September 11, 2001.

b. NTC Status in the Asia-Pacific

Most states in the Asia-Pacific have signed the NTC. The exceptions are Brunei, Indonesia, Laos, Myanmar, North Korea, and Vietnam. Pacific Island States that have not signed the convention are Cook Islands, Marshall Islands, Micronesia, Nauru, Niue, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, and Vanuatu. Specific information on submission dates by individual states is available at: http://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XVIII/XVIII-15.en.pdf

c. Significant Reservations and Declarations

Upon signature, India made a reservation that excludes obligation to Article 23 Paragraph 1 in relation to disputes settlement. Article 23 requires that any dispute that cannot be settled "within reasonable time" shall be submitted to arbitration by request. Furthermore, if agreement is not reached within six months of such a request, any party may refer proceedings to the International Court of Justice.

2.5 Fissile Materials Cut-off Treaty (FMCT)

a. General Information

Draft U.S. version of the treaty: http://geneva.usmission.gov/Press2006/0518DraftFMCT.html.

Statements by regional organizations and individual countries on the FMCT made during the 2007 Session of the UN Conference on Disarmament: http://www.reachingcriticalwill.org/political/cd/speeches07/topics.html#fmct.

The Fissile Material Cut-off Treaty (FMCT) is currently under discussion in the Conference on Disarmament (CD). In December 1993, the UN General Assembly adopted a resolution that recommended the negotiation of a non-discriminatory, multilateral, and internationally verifiable treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices. This resolution became known as the FMCT. Although the committee was not initiated, yet many states still refer to this event as a starting point for negotiations. The CD first reached consensus in 1995 on a mandate (Shannon Mandate) for an ad hoc committee to settle the issue of existing stocks and other relevant issues. But internal CD agenda disputes, including disputes over landmines and nuclear disarmament, prevented the formation of this negotiating

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committee until Aug. 11, 1998 when the CD decided by consensus to establish a committee to negotiate a FMCT.

The production of weapons-grade fissile materials is a major issue for the global nonproliferation regime. However, negotiations have been blocked by a lack of international consensus, particularly concerning the scope of the potential treaty. Some states, including members of the Non-Aligned Movement (NAM), believe the treaty should include fissile materials already produced and stockpiled, and require that they be rendered unusable. A number of states, such as the United States, the United Kingdom and other nuclear weapon states, argue the cut-off should only apply to the future production of fissile materials. Others think an FMCT should also include the management of existing stocks as well as a ban on future production. There is also contention over whether the treaty should also include some non-fissionable materials also used in the production of nuclear weapons, such as tritium. Further complicating the issue is the preference by some states that the FMCT negotiations should be linked with other issues, such as the prevention of an arms race in outer space. Other states believe negotiations should begin without preconditions to break the stalemate that has arisen due to a lack of consensus on the scope and nature of a potential treaty.

All states parties to the NPT endorsed the immediate commencement of FMCT negotiations at both the 1995 and 2000 NPT Review Conferences, and the negotiation of an FMCT was one of the 13 steps towards disarmament produced at the end of the 2000 NPT Review Conference. Despite this, a program of work including FMCT negotiations has yet to be approved in the CD.

b. Draft Texts

Since the proposal of the Shannon Mandate, a number of draft treaties have been put forward. In 2003, Japan produced a draft treaty, after holding informal discussion at home and in Geneva. The draft states that negotiations should be initiated based on the Shannon Report (CD/1299), future production should be considered independently from the issue of existing stocks to prevent a further delay in negotiations, the production of fissile material for peaceful purposes should not be included in the FMCT since the treaty will deal only with the use of such material for weapons or other explosive devices, a verification system should draw from the measures provided by the CSA and AP, and military facilities should be included in the verification system.

In May 2004, Greenpeace proposed yet another draft treaty. This draft addressed definitions, production, separation and storage facilities, existing stocks, the establishment of a Comprehensive Fissile Material Treaty Organization, a Conference of Member States, a Council as the executive organ, a Technical Secretariat and International Data Center, measures for national implementation of the treaty, and a system of international verification.

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In 2006, the United States put forward its draft treaty, which calls for banning the production of fissile materials for nuclear weapons and other nuclear explosive devices. It defined "fissile material" as:

- Plutonium except plutonium whose isotopic composition includes 80 percent or greater plutonium-238
- Uranium containing a 20 percent or greater enrichment in the isotopes uranium-233 or uranium-235
- Any material that contains the material defined in the two categories above.

The U.S. draft treaty does not include existing stocks or a verification system.

3. Radiological Materials Agreements

3.1 The Basel Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal

a. General Information

Opened for Signature: 22 March 1989

Number of Parties: 172

Number of Signatories: 53

Status: Entered into force 5 May 1992; open to states and political and/or economic integration organizations

Inspection /Verification: Yes

Additional information: http://www.basel.int.

In the late 1980s, the dramatic rise in the cost of disposing hazardous waste due to a tightening of environmental regulations in industrialized countries led to the undesirable practice of shipping waste from developed to developing countries especially in Eastern Europe. This led to the development of the Basel Convention. While the Convention was developed to address a broad range of hazardous waste materials, its provisions have also been applied to the disposal of radiological waste materials and served as the basis for development of other Conventions dealing with WMD-related materials.

The initial focus of the Convention was setting up a framework for controlling the international movement of hazardous waste, and developing the criteria for "environmentally sound management." Since 2000, the Convention has built on the initial framework by emphasizing the implementation and enforcement of commitments.

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There has also been recognition that reducing the amount of waste generated is one solution to the issue of long-term waste storage.

The Convention covers hazardous wastes defined as those that are toxic, poisonous, explosive, corrosive, flammable, ecotoxic, and infectious and addresses financial responsibility in the event of an incident. These responsibilities take into consideration the many stages of transboundary movement, from generation to export, international transit, import, and disposal. Under the Convention, transboundary movements of hazardous wastes or other wastes are controlled by formal codes and procedures. The Basel Convention's Secretariat represents a key component of the agreement. This office cooperates with national authorities in developing national legislation, setting up inventories of hazardous wastes, strengthening national institutions, assessing the hazardous waste management situation, and preparing hazardous waste management plans and policy tools. It also provides legal and technical advice to countries in order to solve specific problems related to the control and management of hazardous wastes. The Basel Convention has also established Regional Centers for Training and Technology Transfer tasked with providing detailed guidance on the technical, technological, and enforcement aspects of the Convention.

Although many Pacific Island States have not signed this convention, they have in place the Waigani Convention, which acts in a similar capacity by banning the importation of hazardous wastes into the South Pacific region.

The United States signed the Basel Convention in 1990 and has provided its advice and consent to ratification as of 1992. However, additional legislation to provide the necessary statutory authority to implement the convention is required before ratification is complete. Until this occurs, the U.S. remains a non-party, allowed to participate, but not allowed to vote.

An additional amendment to the Convention was adopted in 1995 to prohibit the export of hazardous wastes, for both recycling and disposal. To date, the amendment has not been ratified and it has not yet gone into force for any party

b. Basel Convention Status in the Asia-Pacific

The following states in the Asia-Pacific have not signed the Basel Convention: Fiji, Laos, Myanmar, Niue, North Korea Palau, Solomon Islands, Timor Leste, Tonga, Tuvalu, and Vanuatu.

Specific information on submission dates by individual states is available at:
http://www.basel.int/ratif/convention.htm
http://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XXVII/XXVII-3.en.pdf

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c. Reservations and declarations

The Basel Convention does not have provision for reservations, however a number of states made declarations concerning navigational rights and freedoms.

Germany declared upon signature (23 October 1989) and confirmed upon ratification its understanding that the provisions in Article 4 (12) shall in no way affect the exercise of navigational rights and freedoms as provided for international law and reflected in other international instruments. Particular reference was made to the free passage, without notice or consent, of hazardous wastes on a vessel under the flag of a party exercising its right of innocent passage and freedom of navigation. Italy, Japan, Singapore, Spain and the United Kingdom made similar declarations.

Indonesia stated upon accession (20 September 1993) of its need to adjust and enact existing national laws and regulations, in order to implement Article 3 (1) of the Convention.

The Russian Federation noted that the definition of "Territory" in the Cairo Guidelines and Principles for the Environmentally Sound Management of Hazardous Wastes, which is referenced in the Convention's preamble, cannot be used in the interpretation of the Convention in light of Article 31(2) or Article 32 of the 1969 Vienna Convention on the Law of Treaties.

3.2 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (JC)

a. General Information

Opened for Signature: 29 September 1997

Number of Parties: 46

Number of Signatories: 42

Status: Entered into force 18 June 2001

Inspection/Verification: No

Additional information:
http://www.iaea.org/Publications/Documents/Conventions/jointconv.html.

The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management aims to achieve and maintain a high level of safety in spent fuel and radioactive waste management by enhancing national measures and international cooperation to prevent accidents with radiological consequences and ensuring there are effective defenses against potential hazards so that individuals, society,

and the environment are protected against the harmful effects of ionizing radiation. It is the first international instrument that deals with the safety of management and storage of radioactive waste and spent fuel in countries with and without nuclear programs. It also considerably elaborates on and expands the existing IAEA nuclear safety regime and promotes international standards in the area. Each Contracting Party must establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management, including a licensing system, inspection, and enforcement of the terms of the licenses and regulations.

The JC applies to spent fuel and radioactive waste resulting from civilian nuclear reactors and applications and to spent fuel and radioactive waste from military or defense programs if and when such materials are transferred permanently to and managed within exclusively civilian programs, or when declared as spent fuel or radioactive waste for the purpose of the Convention by the Contracting Party. It also applies to planned and controlled releases into the environment of liquid or gaseous radioactive materials from regulated nuclear facilities.

The Convention establishes rules and conditions for the transboundary movement of spent fuel and radioactive waste that *inter alia* require a state of destination to have adequate administrative and technical capacity and regulatory structure to manage spent fuel or radioactive waste in a manner consistent with the Convention. It obligates a state of origin to take appropriate steps to permit re-entry into its territory of such material if a transboundary movement cannot be completed in conformity with the Convention.

b. Joint Convention Status in the Asia-Pacific

The Joint Convention has been adopted by nine of the states (Australia, Canada, China, Japan, Indonesia, Philippines, Russia, South Korea, and the U.S.) in the Asia Pacific region. Specific information on submission dates by individual states is available at: http://www.iaea.org/Publications/Documents/Conventions/jointconv_status.pdf

c. Significant Reservations and Declarations

Only four declarations/reservations were made to this Convention, focusing on the definition of "spent fuel management," the territories to be covered by or excluded from the Convention, and the alignment of treaty provisions and domestic law.

In a declaration received 3 July 2007, China stated that the Convention applies to the Hong Kong Special Administrative Region, but does not apply to the Macao Special Administrative Region. Similarly, Denmark stated the Convention does not apply to Greenland and the Faroe Islands.

Euratom submitted a reservation in regard to non-compliance of Article 12(1)

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Japan declared upon accession to the Convention (26 August 2003) that spent fuel waste management, pursuant to Article 3(1), includes reprocessing.

3.3 Convention on Early Notification of a Nuclear Accident or Radiological Emergency

a. General Information

Opened for signature: 26 September 1986 (at Vienna) and 6 October 1986 (at New York)

Status: Entered into force on 27 October 1986. (Thirty days after the date on which three states expressed their consent to be bound by the Convention, as required under Article 12

Additional information:
http://www.iaea.org/Publications/Documents/Conventions/cenna.html.

Adopted in 1986 following the Chernobyl nuclear plant accident, this Convention establishes a notification system for nuclear accidents which have the potential for international transboundary release that could be of radiological safety significance for another state. This Convention aims to strengthen international cooperation in order to provide relevant information about nuclear accidents as early as necessary. States party commit that, in the event of a nuclear accident that may have transboundary radiological consequences, they will notify countries that may be affected and the IAEA, and provide relevant information on the development of the accident. In turn, the IAEA informs other states that may be physically affected and relevant international organizations of a notification received and promptly provides other information on request. Each state Party and the IAEA have identified 24-hour warning points to which a notification can be directed, as well as competent authorities who are authorized to send notifications and verify information provided. The IAEA maintains an up-to-date list of such authorities and warning points and provides it to states parties, member states and relevant international organizations.

The Convention requires states to report the accident's time, location, radiation releases, and other data essential for assessing the situation. Reporting is mandatory for any nuclear accident involving any nuclear reactor wherever located; any nuclear fuel cycle facility; any radioactive waste management facility; the transport and storage of nuclear fuels or radioactive wastes; the manufacture, use, storage, disposal and transport of radioisotopes for agricultural, industrial, medical and related scientific and research purposes; and the use of radioisotopes for power generation in space objects (Article 1). Under Article 3, states may notify other accidents as well. The five nuclear-weapon states (China, France, Russia, the United Kingdom, and United States) have all declared their intent also to report accidents involving nuclear weapons and nuclear weapons tests.

b. Convention on early notification in the Asia Pacific

All states in the Asia-Pacific have signed the Convention except Brunei, Cambodia, Laos, and Timor-Leste. None of the Pacific Island States (Cook Islands, Fiji, Marshall Islands, Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, Tonga, Tuvalu, and Vanuatu) have signed the Convention. Specific information on submission dates by individual states is available at:
http://www.iaea.org/Publications/Documents/Conventions/cenna_status.pdf

c. Significant reservations and declarations

A large number of states (including the following CSCAP members and observers: China, France, India, Indonesia, Malaysia, Myanmar, North Korea, Romania, Russia, Spain, Thailand, U.S., Vietnam) expressed the reservation that they would not be bound by dispute settlement through arbitration or submission to the International Court of Justice as stated in Article 11 of the convention.

India expressed a reservation that the Convention was defective because it made a distinction between nuclear and non-nuclear states and did not make it mandatory for nuclear weapons states to make notification of accidents involving nuclear weapons tests.

3.4 Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency

a. General Information

Opened for signature: 26 September, 1986

Status: Entered into force on 26 February 1987

Additional information:
http://www.iaea.org/Publications/Documents/Conventions/cacnare.html

This Convention requires that states parties cooperate between themselves and with the IAEA to facilitate prompt assistance in the event of a nuclear accident or radiological emergency to minimize its consequences and to protect life, property and the environment from the effects of radioactive releases. In the event of a nuclear accident or radiological emergency, the IAEA's functions are to make available to a state party or a member state requesting assistance appropriate resources for the purpose of conducting an initial assessment of the accident, transmit requests for assistance and relevant information to states parties that may possess the necessary resources, offer its good offices to the states parties or member states, liaise with relevant international organizations to obtain and exchange relevant information, and, on request, coordinate the assistance at the international level. Each state party and the IAEA have identified 24-hour warning points to which a request for assistance can be directed, as well as competent authorities who are authorized to send requests and to arrange for the

provision of assistance. The IAEA maintains an up-to-date list of such authorities and warning points and provides it to states parties, member states and relevant international organizations.

The Convention requires states to notify the IAEA of their available experts, equipment, and other materials for providing assistance. In case of a request, each state party decides whether it can render the requested assistance as well as its scope and terms. Assistance may be offered without costs taking into account the needs of developing countries and the particular needs of countries without nuclear facilities. The IAEA serves as the focal point for such cooperation by channeling information, supporting efforts, and providing its available services.

b. Convention on assistance in the Asia-Pacific

All States in the Asia-Pacific region have signed the Convention of assistance except Brunei, Cambodia, Laos, Myanmar, and Timor Leste. None of the Pacific Island States (Cook Islands, Fiji, Kiribati, Marshall Islands, Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, Tonga, Tuvalu, and Vanuatu) have signed the Convention. Specific information on submission dates by individual States is available at:
http://www.iaea.org/Publications/Documents/Conventions/cacnare_status.pdf

c. Significant reservations and declarations

Several states have expressed reservations regarding taxation privileges and immunities for those proving assistance, exemption from claims and compensation in cases of gross negligence, and dispute remedies that include referral to arbitration or the International Court of Justice.

3.5 Vienna Convention on Civil Liability for Nuclear Damage

a. General Information

Opened for signature: 21 May 1963

Status: Entered into force on 12 November 1977, three months after the date of deposit with the Director General of the fifth instrument of ratification, in accordance with Article 23

Amendment: In 1997, the Vienna Convention was amended and the Convention on Supplementary for Nuclear of Nuclear Damage was adopted.

Additional information:
http://www.iaea.org/Publications/Documents/Conventions/liability.html

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The Convention is the fundamental international legal document setting liability, procedure, timeframe, and principles of offsetting damage resulting from incidents at civilian nuclear installations contains a number of uniform rules to be applied by all contracting parties. The objective is to establish minimum standards to provide financial protection against damage resulting from peaceful uses of nuclear energy. Under the Convention, the country responsible for a nuclear installation or an operator appointed by it should offset damage resulting from any incident in line with a relevant decision of a court in the country where the incident takes place. Each signatory is to set the upper liability limit that cannot be below $5 million. The money is meant to compensate victims both in the country the incident takes place and abroad. Insofar as its provisions are self-executing, each state can choose between the incorporation of the Convention in the domestic legal system, thus allowing for its direct application, and the adoption of national legislation specifically implementing the Convention. The Convention does not cover the issue of state responsibility or liability for nuclear damage. Article 13 makes it clear that the Convention is not to be "construed as affecting the rights, if any, of a Contracting Party under the general rules of public international law in respect of nuclear damage."

The 1997 Protocol sets the possible limit of the operator's liability at not less than 300 million Special Drawing Rights (roughly equivalent to $400 million). The Convention on Supplementary Compensation defines additional amounts to be provided through contributions by states parties on the basis of installed nuclear capacity and United Nations rate of assessment. The Protocol also provides a better definition of nuclear damage by incorporating the concept of environmental damage and preventive measures.

b. Vienna Convention on Civil Liability in the Asia-Pacific

The only states in the Asia-Pacific that have signed the Vienna Convention on Civil Liability for Nuclear Damage are the Philippines and Russia. Specific information on submission dates by individual states is available at:
http://www.iaea.org/Publications/Documents/Conventions/liability_status.pdf

3.6 Paris Convention on Third Party Liability in the Field of Nuclear Energy

a. General Information:

Opened for signature:	29 July 1960
Status:	Entered into force on 1 April 1968
Amendment:	Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982
Additional information:	http://www.nea.fr/html/law/nlparis_conv.html.

The Convention on Third Party Liability in the Field of Nuclear Energy was established under the auspices of the OECD Nuclear Energy Agency (NEA) and covers most West European countries. It is open to any OECD country as of right and to any non-member with the consent of the other contracting parties.

The purpose of the Convention is to provide adequate compensation to the public for damage resulting from a nuclear accident and to ensure that the growth of the nuclear industry would not be hindered by bearing an intolerable burden of liability. The compensation includes injury to or loss of life of any person, and for damage to, or loss of any property caused by a nuclear accident in a nuclear installation or during the transport of nuclear substances to and from installations. It does not cover damage to the nuclear installation itself.

The Paris Convention generally applies when an accident causing damage occurs in the territory of a party and damage from this accident is suffered in the territory of a party, including the territorial sea. In 1968, the NEA Steering Committee recommended that the Convention cover nuclear incidents occurring or nuclear damage suffered on the high seas and in 1971, it recommended that the Convention apply to damage suffered in a Paris Convention state even if the nuclear incident occurs in a state not party to the Convention. Many of the Paris Convention states have adopted these recommendations.

b. Paris Convention on third party liability in the Asia-Pacific

None of the states in the Asia-Pacific have signed the Paris convention on third party liability. Specific information on submission dates by individual states is available at: http://www.nea.fr/html/law/nlparis_conv.html.

3.7 Convention on Supplementary Compensation for Nuclear Damages (CSC)

a. General Information:

Opened for Signature: 29 September 1997

Number of Parties: 13

Number of Signatories: 4

Status: Not yet entered into force

Inspection/Verification: No

Additional information:
http://www.iaea.org/Publications/Documents/Conventions/supcomp.html.

The convention recognizes the importance of the measures provided in the Vienna Convention on Civil Liability for Nuclear Damage and the Paris Convention on Third

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Party Liability in the Field of Nuclear Energy as well as in national legislation on compensation for nuclear damage. The intent is to establish a worldwide liability regime to supplement and enhance these measures with a view to increasing the amount of compensation for nuclear damage. It assumes that such a worldwide liability regime would encourage regional and global co-operation to promote a higher level of nuclear safety in accordance with the principles of international partnership and solidarity.

On the ninetieth day following the date on which at least five states representing among them at least 400,000 megawatts (thermal) of installed nuclear capacity have deposited an instrument of ratification, acceptance or approval the CSC will be considered entered into force. It will enter into force for any state that subsequently ratifies, accepts, approves, or accedes to the convention ninety days following the deposit of its instrument. The convention contains definitions of twelve terms pertaining to "nuclear damage," thus reflecting a need to address differing concepts of tort liability while at the same time ensuring uniformity with respect to particular core elements. It also requires that the "minimum national compensation amount" be distributed equitably without discrimination on the basis of nationality, domicile or residence. Domestic and transboundary victims are required to be treated by the courts of the signatory state without regard to their nationality when allocating the first tier of compensation.

The signature of many states has been contingent upon the approval of the convention by the United States. With the U.S. depositing its ratification on May 21, 2008, there should be renewed interest by other states. In the ratification process, the U.S. expressed reservation with the dispute resolution procedures outlined in the convention.

b. Convention on supplementary compensation in the Asia-Pacific

Only Australia, Indonesia, the Philippines, and the U.S. have signed the Convention on supplementary compensation. None of the Pacific Island States have signed the Convention. Specific information on submission dates by individual states is available at: http://www.iaea.org/Publications/Documents/Conventions/supcomp_status.pdf

4. Nuclear Weapons in the Commons and Test Bans

4.1 Outer Space Treaty

a. General information

Opened for Signature:	27 January, 1967
Number of Parties:	62
Number of Signatories:	98
Status:	Entered into force 10 October, 1967

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Inspection/Verification: No

Additional information: http://www.unoosa.org/oosa/SpaceLaw/outerspt.html.

The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies was the second of the so-called "nonarmament" treaties; its concepts and some of its provisions were modeled on its predecessor, the Antarctic Treaty. Like that treaty it sought to prevent "a new form of colonial competition" and the possible damage that self-seeking exploitation might cause. Between 1959 and 1962 the Western powers made a series of proposals to bar the use of outer space for military purposes. Addressing the General Assembly on September 22, 1960, President Eisenhower proposed that the principles of the Antarctic Treaty be applied to outer space and celestial bodies.

Article 4 prohibits placing in orbit around the Earth, installing on the moon, any other celestial body, or otherwise station in outer space, nuclear or any other weapons of mass destruction. Additionally, it limits the use of the moon and other celestial bodies exclusively to peaceful purposes and expressly prohibits their use for establishing military bases, installation, or fortifications; testing weapons of any kind; or conducting military maneuvers.

The Soviet Union initially objected based on a demand that a prohibition on all foreign military bases should be included in the treaty. After the signing of the LTBT, the Soviet Unions dropped the linkage.

b. Outer Space Treaty in the Asia-Pacific

All states in the Asia-Pacific have signed the Outer Space Treaty except Brunei, Cambodia, and Timor Leste. In addition, the Pacific Island States of Cook Islands, Kiribati, Marshall Islands, Micronesia, Nauru, Niue, Palau, Samoa, Solomon Islands, Tuvalu, and Vanuatu) have not signed the Treaty. Specific information regarding the status of individual states is available at:
http://www.unoosa.org/oosatdb/showTreatySignatures.do
http://disarmament.un.org/TreatyStatus.nsf

4.2 Seabed Arms Control Treaty

a. General information

Opened for Signature: 11 February, 1971

Number of Parties: 66

Number of Signatories: 89

Status: Entered into force 18 May, 1972

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Inspection/Verification: Yes

Additional information: http://disarmament.un.org/TreatyStatus.nsf

The full title of the Treaty is the Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof. In the 1960s, advances in the technology of oceanography and elevated interest in previously untapped resources of the ocean floor led to concern that the absence of clearly established rules of law might lead to conflict. There also existed concerns that the seabed could become a new environment for military installations, including those capable of launching nuclear weapons. The treaty shared with the spirit of the Outer Space Treaty, the Antarctic Treaty, and the various Nuclear Weapons-Free Zones treaties to prevent the introduction of international conflict and nuclear weapons into new areas and environments not established by previous treaties.

The Treaty sought to prevent the introduction of international conflict and nuclear weapons into an area that had otherwise been free of them. It prohibits the placement of nuclear weapons or weapons of mass destruction on the seabed and the ocean floor beyond a 12-mile coastal zone to be measured in accordance with the provisions of the 1958 Convention on the Territorial Sea and the Contiguous Zone. It allowed parties to undertake verification using their own means, with the assistance of other parties, or through appropriate international procedures within the framework of the United Nations and in accordance with its Charter allowing parties to assure themselves the obligations were being fulfilled without interfering with legitimate seabed activities. It stipulates that parties are to work for further measures to prevent an arms race on the seabed.

There was some friction in the differences between the drafts of the United States and the Soviet Union. Prominent among these differences was that the USSR proposed using the Outer Space Treaty as a precedent for inspection, deciding that all installations and structures would be open, provided that reciprocity was observed. The U.S. believed that the Outer Space Treaty was an unsuitable precedent since no claims of national jurisdiction existed on the moon and that provisions suitable for the Moon would not be adequate for the seabed where national jurisdiction had been and was in the process of being articulated. The Soviet-approved draft would have banned all military uses of the seabed and would have precluded such things as submarine surveillance systems that were fixed to the ocean floor. The U.S. regarded these systems as essential. Also, coastal states were concerned about whether their rights would be respected and if they possessed the ability to check on violations. Some wondered whether the verification procedures would really be effective.

b. Seabed Arms Control Treaty in the Asia-Pacific

The Seabed Arms Control Treaty has not been signed by Brunei, North Korea, and Timor Leste. In addition, none of the Pacific Island States (Cook Islands, Fiji, Kiribati, Marshall Islands, Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands,

Tonga, Tuvalu, and Vanuatu) have signed the Treaty. Specific information regarding the status of individual states is available at:
http://disarmament.un.org/TreatyStatus.nsf
http://www.fas.org/nuke/control/seabed/text/seabed3.htm

4.3 Threshold Test Ban Treaty (TTBT)

a. General Information

Opened for Signature: 1974

Status: Entered into force 1990

Inspection/Verification: Yes

Additional information: http://www.state.gov/t/ac/trt/5204.htm
http://www.atomicarchive.com/Treaties/Treaty10.shtml

The official title of the treaty is the Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Underground Nuclear Weapons Tests and the Protocol. In an effort to limit the nuclear arms race and to pursue nuclear disarmament, the United States and the Union of Soviet Socialist Republics (USSR) entered into a series of negotiations which resulted in several treaties since 1960s. The TTBT established a nuclear testing "threshold," by prohibiting tests having a yield exceeding 150 kilotons (equivalent to 150,000 tons of TNT). The threshold is militarily important since it removes the possibility of testing new or existing nuclear weapons going beyond the fractional-megaton range. Although the TTBT was signed in 1974, it was not sent to the U.S. Senate for ratification until July 1976. Submission was held up until the companion Peaceful Nuclear Explosions Treaty (PNET) had been successfully negotiated. The U.S. and the USSR began negotiations in November 1987 to reach agreement on additional verification provisions that would make it possible for the U.S. to ratify the treaties. Agreement on additional verification provisions, contained in new protocols, substituting for the original protocols, was reached in June 1990, and the TTBT and PNET entered into force on 11 December 1990.

The yields of underground nuclear weapons detonations are monitored by national technical means or inspection using either of the following methodologies: hydrodynamic yield measurement, hydro plus yield measurement, seismic yield measurement, and on-site inspection. The treaty applies to only the following test sites: For the United States, the Nevada Test Site; and for the Russian Federation, the Northern Test Site (Novaya Zemlya), and Semipalatinsk Test Site (Now located in Kazakhstan). The Semipalatinsk site has been essentially shut down. The treaty included a protocol that detailed the technical data that had to be exchanged and limited weapon testing to specific designated sites to assist in verification. The data to be exchanged includes information on the geographical boundaries and the geology of the testing areas. The TTBT also stipulated that data be exchanged on a certain number of tests for calibration purposes, which

improved assessments by other parties of the yields of explosions based primarily on the measurements derived from their seismic instruments.

The TTBT represented a significant degree of direct cooperation by the two major nuclear powers in the effort to control nuclear weapons. For the first time, each party agreed to make available to the other data relating to its nuclear weapons test program.

The TTBT is a bilateral agreement between the U.S. and USSR.

4.4 Peaceful Nuclear Explosions Treaty (PNET)

a. General Information

Opened for Signature: 28 May, 1976

Status: Entered into force 11 December, 1990

Inspection/Verification: Yes

Additional information: http://www.atomicarchive.com/Treaties/Treaty11.shtml.

As a result of the TTBT, the U.S. and the Soviet Union anticipated the necessity of addressing underground nuclear explosions for peaceful purposes. The PNET addressed the detonation of nuclear devices at locations outside those designated by the TTBT. It limited individual yield to 150 kilotons, group yield to 1,500 kilotons, and mandated identifiable measurement for yields greater than 150 kilotons. It also established a protocol so that no advancements beneficial to weapons development could be derived from the detonation of nuclear devices for peaceful purposes.

4.5 Partial (Limited) Test Ban Treaty

a. General information

Opened for Signature: 5 August, 1963

Number of Parties: 94

Number of Signatories: 103

Status: Entered into force 10 October, 1963

Inspection/Verification: No

Additional information:
http://disarmament.un.org/TreatyStatus.nsf/44e6eeabc9436b78852568770078d9c0/35ea6a019d9e058a852568770079dd94?OpenDocument

The development of the LTBT reflected a growing concern over the environmental and health consequences of testing of nuclear weapons as research on the potential damages became clear. As a result of the hydrogen bomb tests in the 1950s, there was concern about radioactive fallout and the likelihood of even greater damage from more powerful nuclear devices. The treaty prohibits any nuclear weapon test explosion, or any other nuclear explosion, at any place under the state's jurisdiction or control:

(a) In the atmosphere; beyond its limits, including outer space; or under water, including territorial waters or high seas; or

(b) In any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the state under whose jurisdiction or control such explosion is conducted.

b. Limited Test Ban Treaty in the Asia-Pacific

The Limited Test Ban Treaty has been signed by all states in the Asia-Pacific except Brunei, Cambodia, China, North Korea, Timor Leste, and Vietnam. None of the Pacific Island States (Cook Islands, Kiribati, Marshall Islands, Micronesia, Nauru, Niue, Palau, Samoa, Tuvalu, and Vanuatu) have signed the Treaty except Fiji and Papua New Guinea, and Tonga. Specific information regarding the status of individual states is available at:
http://disarmament.un.org/TreatyStatus.nsf
http://en.wikipedia.org/wiki/List_of_Partial_Test_Ban_Treaty_signatories

4.6 Comprehensive Nuclear Test Ban Treaty (CTBT)

a. General Information

Opened for Signature: 24 September 1996

Number of Parties:

Number of Signatories: 180

Status: Not yet entered into force. The Treaty will enter into force 180 days after all 44 of the states that at the time of the opening for signature of the Treaty possessed nuclear weapons or nuclear weapons technology.

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Inspection / Verification: Yes

Additional information: http://www.ctbto.org.

The Comprehensive Nuclear Test Ban Treaty, which was completed in 1996 after four years of intense negotiation, bans all nuclear test explosions. Although proposals for a total ban on nuclear testing were first expressed in the 1950s at the time the Limited Test Ban Treaty was being developed, negotiations for the CTBT did not begin until after the Cold War ended. The Treaty includes implementation measures, a verification regime, punitive measures for violators, and a dispute resolution mechanism.

The verification regime includes an international monitoring system, consultation and clarification, on-site inspections, and confidence building measures. The use of national technical means for verification is explicitly provided for in Article 3. Requests for on-site inspections must be approved by at least 30 affirmative votes of members of the treaty's 51-member Executive Council, which must act within 96 hours of receiving a request for an inspection.

Due to existing nuclear weapons capabilities or the potential for these to be developed from current civilian nuclear programs, ratification of the CTBT by 44 specific states named in Article 14 of the Treaty is required before it will enter into force. Three of these states (India, Pakistan and North Korea) have not signed the treaty and six more (China, Egypt, Indonesia, Iran, Israel, and the U.S.) have signed but not ratified the Treaty.

The Treaty has been slow in moving toward entrance into force largely due to the lack of ratification by the United States. In 1999, the U.S. Senate voted not to ratify the Treaty and there have been no subsequent attempts. Most opposition in the U.S. has been driven by concerns over stockpile stewardship and test verification procedures. Critics have contended that in the absence of nuclear testing, the U.S will be unable to maintain its expertise in nuclear weapons or to ensure the reliability and safety of its nuclear stockpile. Furthermore, under these circumstances, opponents contend that the U.S. and its allies would not be able to maintain the necessary confidence in its nuclear deterrent.

The issue of verification focuses on the whether and the degree to which a state could successfully conduct a nuclear test and evade detection. Criticism has specifically centered on the ability to detect low-yield tests of less than one kiloton. It is alleged that sophisticated advanced nuclear weapon states would be able to conduct militarily significant tests without being detected, which would enable them to verify the reliability of their weapons or to develop new ones, while treaty signatories would be constrained by the restrictive language of the treaty.

A third criticism stems from the concern that rogue regimes that were undeterred from proliferating despite being adherents to the NPT would not be deterred by a CTBT. This is related to the fact that states interested in first-generation nuclear devices, about which information is readily available, could have confidence in the reliability of such weapons

without the need to test them, rendering the CTBT ineffective in preventing new states from acquiring nuclear weapons.

There have also been three other issues that have been the source of controversy since the CTBT was first introduced until 1996. One was a U.S. proposal to include a provision allowing a state to leave the treaty after ten years without justification. This proposal was withdrawn in January 1995. A second pertained to whether the treaty should allow small, low-threshold nuclear tests or ban all tests regardless of yield. The treaty calls for a complete ban. The third issue involved the determination of when the treaty was to be considered entered into force. The agreement states that ratification by 44 states on the International Atomic Energy Agency's nuclear power or research reactor list is required. An alternative proposal has been that ratification should be by "key nuclear states."

b. CTBT status in the Asia-Pacific

All states in the Asia-Pacific have signed the CTBT except India and North Korea. In addition the Pacific Island States of Niue, Tonga, and Tuvalu have not signed the Treaty. Specific information regarding the status of individual states is available at: http://www.ctbto.org/the-treaty/status-of-signature-and-ratification/

c. Significant Reservations and Declarations

This Treaty does not allow for reservations to the Articles or Annexes. However reservations to the provisions of the Protocols and Annexes to the Protocol are allowed provided they are compatible with the object and purpose of the Treaty.

China declared its commitment to the principles of the destruction of nuclear weapons leading to the realization of a nuclear-weapons-free-world. China's appeals upon signature focused on, disarmament of stockpiles used for deterrence; government removal of nuclear arsenal from foreign soil; call for states to refrain from developing weapons in space; and an international convention on the complete prohibition through the destruction of nuclear weapons. Furthermore, the Chinese government endorsed the application of verification measures consistent with the CTBT to ensure implementation in good faith however, opposing any abuse of these rights to infringe on national sovereignty or the use of espionage or human intelligence.

India has not signed the Treaty and has argued that it should include a specific commitment by the nuclear weapon states to eliminate their nuclear weapons in a negotiated finite span of time, and made its support of the draft treaty contingent on such a commitment. India rejected the entry-into-force formula. Given its stated inability to endorse the treaty as drafted, it argued that making ratification by specific states a requirement for entry into force is contrary to customary international law rules that no obligation can be imposed on a state without its consent. On these grounds, it blocked the

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consensus needed under Conference on Disarmament operating rules to move a treaty to the United Nations General Assembly for consideration.

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Chapter 5
Regional Nonproliferation Initiatives

Regional initiatives have played an important part in creating incentives to discourage the proliferation of WMD in the Asia-Pacific. One particular initiative, a nuclear-weapons-free zone, has been created in several regions of the world. This chapter provides a summary of the seven treaties that have been developed for this purpose both in the Asia-Pacific region and other regions of the world.

A nuclear-weapons-free zone (NWFZ) is defined by the United Nations as an agreement to ban the use, development, or deployment of nuclear weapons in a given area. Additionally, these agreements have mechanisms of verification and control to enforce its obligations. NWFZs are conceived as incremental measures toward total nuclear disarmament, and have steadily grown in number since the first, governing Antarctica. Today, there are eight recognized zones that have been achieved or are in the process of acceptance. Also, some countries have not signed international treaties, but have outlawed nuclear weapons, like Austria with the Atomsperrgesetz in 1999. There are also a number of agreements that have been proposed over the years covering the Middle East, the Korean Peninsula, Central Europe, and South Asia.

1. Antarctic Treaty

a. General Information

Opened for Signature: 1 December, 1959

Number of Parties: 47

Number of Signatories: 12

Status: Entered into force 23 June, 1961

Inspection/Verification: No

Additional information: http://www.ats.aq/index_e.htm.

As of the 1950s, activities in the Antarctic had overall, been conducted peacefully and cooperatively. There remained, however, the possibility that exploitable economic resources might be found and thus, the possibility of future rivalry for their control. It was increasingly clear that the isolated and uninhabited attributes of Antarctica might at some point become a potential site for emplacing nuclear weapons. Based on the rationale that the exclusion of armaments is more likely to be achieved than the elimination or control of armaments once they have been introduced, the treaty sought to preempt any attempt to emplace nuclear weapons.

The treaty prohibits "any measures of a military nature, such as the establishment of military bases and fortifications, the carrying out of military maneuvers, as well as the testing of any type of weapons." Military personnel or equipment, however, may be used for scientific research or for any other peaceful purpose. It also prohibits nuclear explosions and the disposal of radioactive waste material in Antarctica, subject to certain future international agreements on these subjects.

b. Antarctic Treaty status in the Asia-Pacific

The following states in the Asia-Pacific have not signed the Antarctic Treaty: Brunei, Cambodia, Indonesia, Laos, Malaysia, Mongolia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, and Vietnam. Of the Pacific Island States, only Papua New Guinea has signed the Antarctic Treaty. Specific information regarding the status of individual states is available at:
http://www.ats.aq/devAS/ats_parties.aspx?lang=e

2. South Pacific Nuclear Free Zone

a. General Information

Opened For Signature: 06 August 1985

Number of Parties: 13

Number of Signatories: 13

Status: Entered into force 11 December 1986

Verification: Yes

Additional information:
http://disarmament.un.org/treatystatus.nsf/44e6eeabc9436b78852568770078d9c0/7c1dc91deecad6ba852568770079dd9c?OpenDocument

The South Pacific Nuclear Free Zone (SPNFZ), also known as the Treaty of Rarotonga was adopted to enhance regional security by stemming nuclear arms competition throughout the South Pacific. SPNFZ was developed as a regional initiative to reinforce three other arms control treaties: the Seabed Treaty, which seeks to exclude the seabed from the arms race by preventing states from emplacing WMD or their launching devices on the seabed, the Limited Test Ban Treaty, which places limitations on the testing of nuclear weapons testing in the atmosphere, out space, and under water, and the Treaty on the Nonproliferation of Nuclear Weapons (NPT), which recognizes the rights of states to conclude regional nuclear free zones.

The Treaty prohibits the testing, manufacture, acquisition, and stationing of nuclear explosive devices in the territory of Parties to the Treaty and the dumping of radioactive

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wastes at sea within the zone. The Treaty also requires all parties to apply full scope International Atomic Energy Agency safeguards to all their peaceful nuclear activities. A comprehensive control system has been established to verify compliance with the Treaty and there are mechanisms, including provision for mandatory on-site inspection, to assure compliance.

The Treaty affirms the right of each party to decide for itself whether to allow visits by foreign ships and aircraft to its ports and airfields. It also explicitly upholds the freedom of navigation on the high seas and passage through territorial waters guaranteed by international law.

The Treaty has three protocols. Under Protocol 1 the United States, France, and the United Kingdom are required to apply the basic provisions of the Treaty to their respective territories in the zone established by the Treaty. Under Protocol 2, the United States, France, the United Kingdom, Russia, and China agree not to use or threaten to use nuclear explosive devices against any party to the Treaty or against any territories located within the zone for which a party to Protocol 1 is responsible. Under Protocol 3, the United States, France, the United Kingdom, Russia, and China agree not to test nuclear explosive devices within the zone established by the Treaty. The protocols were opened for signature on August 8, 1986, in Suva, Fiji. All five nuclear weapon states have signed the Protocols for which they are eligible. The U.S., the United Kingdom and France have signed all three, whereas China and Russia are Party to Protocols 2 and 3 of the Treaty, but did not accede to Protocol 1, since neither state has territories within the zone.

b. Status of States Parties to the Treaty and Protocols

The treaty is open for signature by the members of the Pacific Island Forum. Current signatories include all states in the region (Australia, Cook Islands, Fiji, Kiribati, Nauru, New Zealand, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu) except the Marshall Islands, Micronesia, and Palau. All eligible nuclear weapons states have signed the three protocols and all except the U.S. have ratified them. Specific information regarding the status of individual states is available at: http://www.opanal.org/NWFZ/Rarotonga/rarotonga_en.htm

c. Significant Reservations and Declarations

Article 14 precludes reservations to the treaty.

Russia and China signed and ratified Protocol 2 noting that they do not control any territory in the region.

On ratification of Protocol 2, United Kingdom declared that nothing in the treaty affects the rights under international law to transit the zone or visit ports or airfields within the zone. It also stated that it would not be bound by protocol 2 in the event of an attack on the United Kingdom or its territories.

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3. Southeast Asia Nuclear Weapons Free Zone

a. General information

Opened for signature: 15 December 1995

Number of Parties: 10

Number of Signatories: 10

Status: Entered into force 27 March 1997

Verification: Yes

Additional information: http://www.aseansec.org/2082.htm.

The Southeast Asia Nuclear Weapon Free Zone (SEANWFZ) was established after a decade of negotiating and drafting efforts by the ASEAN Working Group on a Zone of Peace, Freedom and Neutrality (ZOPFAN) in Southeast Asia. The SEANWFZ or Bangkok Treaty applies to the 10 regional states and was signed by the heads of the 10 states/governments in Bangkok.

States parties are obliged not to develop, manufacture or otherwise acquire, possess or have control over nuclear weapons. The treaty also requires states parties to prevent the stationing or testing of any nuclear explosive device and the dumping of radioactive wastes or other radioactive matter by anyone in the territorial sea of the states parties. Parties to the treaty are also prohibited from providing source or special fissionable materials or equipment to any non-nuclear weapon state (NNWS) or any NWS unless subject to safeguards agreements with the International Atomic Energy Agency (IAEA). The treaty zone covers the territories, continental shelves, and exclusive economic zones (EEZ) of the states parties within the zone.

The Treaty has one protocol which is open for signature by China, France, Russia, the United Kingdom, and the United States. The protocol states that these recognized NWS would undertake to respect the treaty and not to contribute to any act, which constitutes a violation of the treaty or its protocol by states parties. They would also undertake not to use or threaten to use nuclear weapons against any state party to the treaty and not to use or threaten to use nuclear weapons within the SEANWFZ. None of the NWS have signed or deposited the protocol.

The treaty provides for a Commission to oversee the implementation of this treaty and ensure compliance with its provisions. The treaty also gives each state party the right to ask another state party for clarification or a fact-finding mission to resolve an ambiguous situation or one which may give rise to doubts about compliance. Verification is to be achieved through reports by members and the exchange of information, and through the

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application of IAEA safeguards. states parties have discretion over visits by foreign ships and aircraft to ports and airfields, transit of airspace by foreign aircraft, and navigation by foreign ships carrying nuclear weapons.

The SEANWFZ Treaty includes two elements that go beyond other existing Nuclear-Weapon-Free Zone (NWFZ) agreements: 1) the zone of application also includes the continental shelves and EEZ of the contracting parties; and 2) the negative security assurance of the protocol implies a commitment by the NWS not to use nuclear weapons against any contracting state or protocol party within the zone of application. In other aspects, the SEANWFZ contains all the standard obligations, prohibitions, and verification and control measures found in other zonal treaties.

The Bangkok Treaty does not have any designated Secretariat, given the informal style of ASEAN, but the Commission at the level of Foreign Ministers and the working group of Senior Officials will work to promote the full implementation of the zone.

b. SEANWFZ Treaty Status among States Parties

All ten ASEAN states (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam) have signed the Treaty.

c. Reservations and Declarations

The state parties to the Treaty still have internal differences over transit rights and port/airfield visits of foreign ships and aircraft.

The NWS have not signed the Protocol to the SEANWFZ Treaty. Stated objections include the inclusion of continental shelves and EEZ, the restriction on the use of nuclear weapons within the zone or from within the zone against targets outside the zone, and the restriction on the passage of nuclear-powered ships through the zone *vis-à-vis* the issue of the high seas as embodied in the UN Convention on the Law of the Sea (UNCLOS). The NWS also raised the issue that the continental shelves and EEZ are not clearly defined in the South China Sea, which creates uncertainty over the scope of the treaty, as well as the treaty's protocol obligations.

The U.S. also expressed concerns regarding the nature of the legally binding negative security assurances to be expected of the parties to the protocol, the alleged ambiguity of the treaty's language concerning the permissibility of port calls by ships, which may carry nuclear weapons, and the procedural rights of the parties to the protocol to be represented before the various executive bodies set up by the treaty to ensure its implementation.

China has indicated a willingness to sign the protocol, although to date it has not taken any formal action to act on its declaration of intent.

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India also has stated its willingness to sign the SEANWFZ protocol. However because the protocol was intended for those NWS recognized in the Nuclear Nonproliferation Treaty, Article 3 of the protocol states that it shall be open for signature only "by the People's Republic of China, France, the Russian Federation, the United Kingdom of Great Britain and Northern Ireland, and the United States of America."

d. Latest developments

Several meetings of the Commission have been held for the purpose of implementing and promoting the Treaty among the signatories as well as the countries outside Southeast Asia, especially the NWS.

In the meeting held in Manila, the Philippines on July 29, 2007, the Foreign Ministers of the state parties to the Treaty of the Southeast Asia Nuclear Weapon Free Zone conducted a thorough review of the implementation of the Treaty during the 10 years since it entered into force in 1997. They expressed appreciation for the ASEAN Secretariat's work in preparing the Stocktaking Paper on the Implementation of the SEANWFZ Treaty, and are pleased to note that the state parties have abided by their responsibilities and obligations under the Treaty. In addition, they considered a plan of action to further enhance cooperation among state parties as well as non-state parties, particularly the nuclear weapon states. They reaffirmed their commitment to further enhance and promote the Southeast Asia Nuclear Weapon Free Zone and resolved to undertake measures under the Plan of Action for the period 2007-2012 which recommends ASEAN states to:

- Ensure compliance with ASEAN undertakings under the SEANWFZ Treaty, including accession to the International Atomic Energy Agency (IAEA) safeguards agreements and related instruments;
- Continue close consultations to pursue the accession of all five nuclear weapon states;
- Seek cooperation with the IAEA, other international and regional bodies, other Nuclear Weapon-Free Zones, Dialogue Partners and other friendly states, in developing legal framework to meet international standards on nuclear safety, establishing regional networks for early notification of nuclear accidents, developing a regional emergency preparedness and response plan and strengthening capacity building in the region on nuclear safety issues;
- Jointly draw up specific work programs/projects to implement the Plan of Action.

The latest Commission on SEANWFZ meeting held on July 21, 2008 in Singapore reaffirmed the importance of continued efforts to implement the Treaty to, among others, secure NWS accession to SEANWFZ Protocol through the Plan of Action.

e. Suggestions to Improve SEANWFZ

In light of the present state of affairs, the following actions might be considered to help achieve the SEANWFZ objectives:

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- To introduce initiatives to link SEANWFZ with other nuclear weapon free zones and encourage the state parties and signatories to the Treaties of NWFZs to implement further ways and means of cooperation among themselves, their treaty agencies and other interested states,
- To help materialize a Stocktaking Paper prepared by the ASEAN Secretariat on the Implementation of the SEANWFZ Treaty with an introduction of a DOC-type of document,
- To continue engaging NWS and other countries with interest and commitment such as China and India to the Treaty of SEANWFZ Protocol,
- To link the SEANWFZ Treaty to the Non-Proliferation regimes in such areas as banning reprocessing and enrichment (while assuring fuel supplies), as well as spent fuel storage,
- To settle internal differences among parties to the SEANWFZ Treaty over some outstanding issues to smooth the SEANWFZ implementation, especially with regard to the nuclear weapon states.

4. Central Asia Nuclear Weapons Free Zone (CANWFZ)

a. General Information

Opened For Signature:	08 September 2006
Number of Parties:	5
Number of Signatories:	5
Status:	Entered into force 08 September 2006
Verification	Yes

The five Central Asian states – Kazakhstan, Krygyzstan, Tajikistan, Turkmenistan, and Uzbekistan – signed a treaty establishing a Central Asian Nuclear Weapon Free Zone (CANWFZ). As the result of negotiations that began in 1997, the CANWFZ treaty text was finalized at talks held in Tashkent, Uzbekistan in February 2005. Reflecting the strategic importance of Central Asia, the eight-year process of negotiating the treaty has been heavily influenced by the nuclear weapons states, especially the U.S. and Russia. To a greater extent than other previous NWFZs, the one in Central Asia will showcase a commitment to nuclear disarmament by a group of states which previously had nuclear weapons on their territory. It will also be the first NWFZ located entirely in the northern hemisphere.

Beyond its political impact, the Central Asian Treaty contains concrete provisions that strengthen regional and international nonproliferation efforts. Under its terms, the states will be the first countries in the world legally bound to adhere to enhanced International Atomic Energy Agency safeguards (the Additional Protocol) for their civilian nuclear

assets. The Treaty also requires them to meet international standards for the physical protection of nuclear material. Considering the danger that Central Asia could become a source or transit corridor for terrorist smuggling of nuclear materials, these terms of the CANWFZ are an important counterterrorism measure. In a unique feature, the treaty also recognizes the environmental damage done to Central Asia by the Soviet nuclear weapons program and pledges to support environmental rehabilitation.

The treaty was signed despite significant opposition from the U.S., United Kingdom, and France. The United States attempted to pressure the United Nations and other international bodies to withhold their support of the treaty. Other critics contended that CANWFZ Treaty is problematic due to the collective security agreement between the States and Russia through the Tashkent Treaty.

b. CANFZ Treaty Status among States Parties

Kazakhstan, Kyrgyzstan, Turkmenistan, Tajikistan, and Uzbekistan have all signed and ratified CANFZ.

5. Latin American Nuclear Weapons Free Zone (LANWFZ)

a. General Information

Opened For Signature:	14 February 1967
Number of Parties:	33
Number of Signatories:	33
Status:	Entered into force 23 October 2002
Verification	Yes

The Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean predates the NPT and represents the first effort by a group of states to establish a nuclear weapon-free zone in a heavily populated region. The Treaty has 33 Latin American and Caribbean Contracting Parties. These states have accepted the application of IAEA safeguards for all their nuclear activities to assist in verifying compliance with the Treaty. The Treaty also establishes a regional organization, the Agency for the Prohibition of Nuclear Weapons in Latin America (known by its Spanish acronym OPANAL), to help ensure compliance with its provisions.

The Treaty officially entered into force in 2002 when all eligible states (Cuba was the lone holdout) signed and ratified (as necessary) the Treaty and its two Protocols and concluded comprehensive safeguards agreements with the IAEA as required. However, most signatories individually waived these requirements and declared the treaty in force

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in 1968 for their respective territories, thereby creating the nuclear-free zone in a piecemeal fashion.

The U.S, China, France, the UK, and Russia are all party to two Protocols to the Treaty. The first Protocol requires parties with international responsibility for territories within the region to respect specific denuclearization provisions of the Treaty and to conclude IAEA safeguards agreements for their territories. The second Protocol requires nuclear weapon states also to respect and support the denuclearization provisions and not use or threaten to use nuclear weapons against Treaty parties. The U.S. has also brought into force a safeguards agreement pursuant to Protocol I that covers the territories in the region for which we are internationally responsible. With France's 1992 ratification of Protocol I, all relevant states have now signed and ratified the two Protocols.

Signatory Countries

All 33 countries (Antigua & Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Kitts/Nevis, St. Lucia, St. Vincent/Grenadines, Suriname, Trinidad & Tobago, Uruguay, Venezuela) in the Latin American region are Contracting Parties to the Treaty.

6. African Nuclear Weapons Free Zone Treaty (Pelindaba Treaty)

a. General Information

Opened For Signature:	11 April 1996
Number of Signatories:	14
Number of Ratifications:	26
Status:	Entry into force after 28th ratification
Verification	Yes

The African Nuclear Weapons Free Zone Treaty is the result of African Union's efforts o create a nuclear free zone for the continent of Africa. All the states of Africa are eligible to become party to the Treaty. Despite the initial objections of the Arab African states, many who refused to sign ANWFZ until Israel relinquished its nuclear weapons; Algeria, Libya, and Mauritania have since reconciled and ratified the treaty.

The Treaty prohibits the research on, development, manufacturing, stockpile, control and acquisition of any nuclear device as well as it prohibits the stationing of any nuclear explosives device and the dumping of radioactive material or waste anywhere in the zone. Signatories retain the right to peaceful nuclear activities that utilize nuclear science and

technology to strengthen security, stability and development. The zone consists of the entire continent of Africa and the following islands: Agalega Island, Bassas da India, Canary Islands, Cape Verde, Cardagos Carajos Shoals, Chagos Archipelago, Comoros, Diego Garcia, Europa, Juan de Nova, Madagascar, Mauritius, Mayotte, Prince Edward & Principe Marion Islands, Reunion, Rodrigues Island, Sao Tome, Seychelles, and Tromelin Island.

The Pelindaba Treaty has three protocols. Under Protocol 1 the United States, the United Kingdom, France, China, and the Russia will not threaten to use a nuclear explosive device against any Treaty party or against any territory of a Protocol 3 party within the African zone. Under Protocol 2 the United States, France, the United Kingdom, the Russian Federation and China are invited to agree not to test or assist or encourage the testing of a nuclear explosive device anywhere within the African zone. Protocol 3 is open to states with dependent territories in the zone and obligates them to observe certain provisions of the Treaty with respect to these territories; only Spain and France may become Parties to this Protocol.

b. Signatory Countries

All countries in the African Union have signed the Treaty except Madagascar. However, only 27 states have ratified it. Specific information regarding the status of individual states is available at:
http://www.africa-union.org/root/AU/Documents/Treaties/List/Pelindaba%20Treaty.pdf

7. Treaty on the Final Settlement With Respect to Germany (2+4 Agreement)

a. General Information

Opened For Signature: 12 September 1990

Number of Signatories: 6

Number of Ratifications: 1

Status: Ratified by unified Germany 3 October 1990

Verification Yes

The 2+4 Agreement was negotiated in 1990 between the Federal Republic of Germany (FRG), the German Democratic Republic (GDR), and the Four Powers which occupied Germany at the end of World War 2 in Europe: France, the United Kingdom, the United States, and the Soviet Union (USSR).

Under the terms of the treaty, the Four Powers renounced all rights they formerly held in Germany. As a result, the reunited country became fully sovereign on 15 March 1991. Germany reaffirmed its renunciation of the manufacture, possession of, and control over

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nuclear, biological, and chemical weapons, and in particular, that the Nuclear Non-Proliferation Treaty would continue to apply in full to the unified Germany. Also, no foreign armed forces, or nuclear weapons, or the carriers for nuclear weapons would be stationed in former East Germany (or deployed there), making it a permanent Nuclear-Weapon-Free Zone. Although the treaty was signed by the western and eastern German states as separate entities, it was ratified by the united Germany (the Federal Republic of Germany) per the terms of the treaty agreement.

8. Mongolia Nuclear Weapons Free Status

a. General Information

Opened For Signature:	3 February 2000
Number of Signatories:	1
Number of Ratifications:	1
Status:	Ratified by Mongolia 3 February 2000
Verification	Yes

On 28 February 2000 Mongolia transmitted to the Secretary General of the United Nations the text of the "Law of Mongolia on its nuclear-weapon-free status," adopted by the Parliament of Mongolia on 3 February 2000 and entering into force on the same day. The Mongolian NWFZ initiative remains unique and innovative in that it is not comprised of a group of countries covering a geographic area but a single state declaring its sovereign territory as being nuclear free. The term "individual countries" as a variation of the Nuclear-Weapon-Free Zones (NWFZs) was unanimously recognized in a UN study completed in 1976 which states that *"obligations relating to the establishment of nuclear-weapon-free zones may be assumed not only by groups of states, including entire continents or large geographical regions, but also by small groups of States and even individual countries."*

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Chapter 6
Plurilateral Initiatives

Following the break-up of the Soviet Union in 1991, the threat of WMD proliferation through networks of disaffected workers dramatically increased. Since the early 1990s there has been a substantially increased risk from countries and international terrorist groups with access to chemical and biological weapons, and at least several states with access to components and technology for making nuclear weapons. Curbing the supply of dangerous technologies, including nuclear technology, is made more difficult by the ambivalent approach of many governments to the perceived threat of WMD proliferation. Some trade off concerns about the spread of WMD against economic and political interests. Others lack the capacity to prevent nonstate actors from using sovereign territory for illegal trafficking of material, equipment, and technology used for the development of WMD and missiles.

In the face of such challenges, some states have argued that international standards of acceptable conduct embodied in treaties like the NPT, the CWC, the BWTC, and other nonproliferation treaties and protocols are being violated while the world seems to be reluctant to impose consequences. The response has been the development of a variety of ad hoc coalitions and arrangements to address the violations and seek better ways to enforce existing multilateral compliance regimes. The range of mechanisms that have been developed under the rubric of plurilateral initiatives is quite extensive both in terms of scope of participation and the focus of concern. They include arrangements designed to control WMD delivery systems, component materials, and technology. By definition, none of these arrangements are treaty-based or legally binding. Some have argued that these types of mechanisms are preferable because they demonstrate a strong political will to act in response to violators and offer more flexibility in their enforcement. A criticism offered by others is that states have used the failure of multilateral treaties as justification for abandoning multilateralism and are pursuing these unaccountable, nontransparent plurilateral initiatives instead of seeking consensus on issues such as disarmament and equal treatment among states parties to the treaties.

1. The IAEA Code of Conduct on the Safety and Security of Radioactive Sources, and Supplementary Guidelines on the Import and Export of Radioactive Sources

a. General Information

Date Published: Code of Conduct 2004, Supplementary Guidelines 2005

Formally Supporting States: 92

Status: Open to all IAEA member States

Additional information:

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http://www-ns.iaea.org/tech-areas/radiation-safety/code-of-conduct.htm

Continuing incidents and accidents involving radiation sources and the new concern about the possible malicious use of these sources indicate a clear need for a comprehensive set of standards and guidance documents. These standards and supplementary guidelines support states in their efforts to ensure an adequate level of both safety and security for radioactive sources and aim to harmonize the national policies, laws and regulations of IAEA member states. While neither of these instruments are legally binding, their facilitation of international cooperation help to prevent the unauthorized use or theft of radioactive materials.

IAEA member states have been urged to formally express their support of the Code and the Guidelines and to encourage other countries to do the same. The IAEA Secretariat has been working with states to develop practical advice in regard to compliance.

b. IAEA Code of Conduct status in the Asia-Pacific

	IAEA Code of Conduct	**IAEA Supplementary Guidance on the Import and Export of Radioactive Sources**		
	Formal Support Expressed	Formal Support Expressed	Contact Point Designated	Response to S.A.Q
Australia	•	•	•	•
Brunei				
Cambodia				
Canada	•	•	•	•
China	•	•	•	
India	•	•	•	•
Indonesia	•		•	
Japan	•	•	•	
Laos				
Malaysia				
Mongolia				
Myanmar				
New Zealand	•	•	•	
North Korea				
Philippines	•	•	•	
Russia	•	•	•	•
Singapore				
South Korea	•		•	
Thailand	•	•	•	•
Timor Leste				
United States	•	•	•	•
Vietnam	•	•	•	
Philippines	•	•	•	
Singapore				
Thailand	•	•	•	•
Vietnam	•	•	•	

None of the Pacific Island States have expressed for support for the Code or the supplementary guidelines. Information in the above table is drawn from the IAEA at:

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http://www.iaea.org/Publications/Documents/Treaties/codeconduct_status.pdf

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2. The Missile Technology Control Regime (MTCR)

a. General Information

Established: 1987

Number of Partners: 34 (at February 2008)

Status: Voluntary commitment with limited membership

Inspection / Verification: No

Additional information: http://www.mtcr.info/english/index.html.

The Missile Technology Control Regime is an informal, voluntary association of countries that seeks to control and prevent the proliferation to state and nonstate actors of materials, equipment and technologies used in unmanned WMD delivery systems. The MTCR is not a treaty and thus creates a political commitment for "partner states." It relies on the adherence of partner states to export policy guidelines (the MTCR Guidelines) regarding a common list of controlled technologies (the MTCR Equipment, Software and Technology Annex). This list includes practically all key equipment and technology needed to develop, produce, and operate missiles. The guidelines and annex are implemented by each partner state in accordance with its domestic legislation.

The MTCR is particularly focused on "Category I" or "MTCR-class" missile systems, classified as those capable of delivering a payload of over 500kg at least 300km. These include rockets (projectiles that free fall to target in the latter stage of their flight trajectory, such as ballistic missiles, space launch vehicles, and sounding rockets) and unmanned aerial vehicle (UAV) systems (which can be manoeuvred for a greater portion of their flight, such as cruise missiles, target drones, and reconnaissance drones).

Established in 1987 by Canada, France, Germany, Italy, Japan, the United Kingdom and the U.S., the MTCR initially focused on stemming the proliferation of nuclear weapons-capable missiles and related technologies. Since 1993, it has expanded its focus to include missiles designed to, or capable of, delivering chemical and biological weapons. The MTCR works by consensus and partner states regularly exchange information about relevant national export licensing issues. The MTCR guidelines are open to all nations to implement, including non-MTCR partners.

b. Membership in MTCR in the Asia-Pacific

Australia, Canada, Japan, Russia, South Korea and the United States are MTCR partner states. A complete list of partner states is provided at:
http://www.mtcr.info/english/partners.html

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3. Hague Code of Conduct against Ballistic Missile Proliferation (HCOC)

a. General Information

Date Introduced: 26 November 2002

Subscribing States: 128 states

Status: Voluntary commitment; open to all states

Inspection / Verification: No

Additional information:
http://www.un.org/News/Press/docs/2004/gadis3286.doc.htm.

The Hague Code of Conduct against Ballistic Missile Proliferation (HCOC) has been called "the most wide-ranging international agreement on missile proliferation signed to date." The HCOC creates a political (as opposed to legal) commitment, with "subscribing states" agreeing "to prevent and curb the proliferation of Ballistic Missile systems capable of delivering weapons of mass destruction" and "to exercise maximum restraint in developing, testing, and deploying" such missiles. This includes, where possible, the disarming of ballistic missile stockpiles. As a voluntary code, there is no inspection or verification regime associated with the HCOC, and its focus is on general principles rather than specific action plans.

The HCOC consists of a set of general guidelines, commitments and confidence-building measures (CBMs). These include pre-launch notifications of peaceful rocket flights and annual declarations on space and ballistic missile policies, which are intended to address proliferation concerns caused by the similarities between technologies used in ballistic missiles and civilian rockets. The HCOC is intended to supplement, rather than replace, the Missile Technology Control Regime (MTCR). Unlike the MTCR, the HCOC is open to all states. Austria serves as the Immediate Central Contact (ICC), although the Code is administered collectively by all subscribing states and has no formal secretariat. Annual meetings are held in Vienna, where subscribing states discuss issues related to implementation of the HCOC and its CBMs and ongoing efforts towards achieving its universalization. All decisions, both procedural and substantive, are taken by a consensus of subscribing states present at meetings.

b. HCOC Status among CSCAP Members & Observers

The most notable gap in buy-in to the HCOC in the Asia-Pacific region is in Southeast Asia, where only two states, Cambodia and the Philippines, have adopted the Code. China, India and North Korea are also yet to subscribe. All Pacific Island States except Nauru, Samoa, and Solomon Islands are subscriber states.

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4. Proliferation Security Initiative (PSI)

a. General Information

Established: May 2003

Number of parties: U.S. State Department website lists 94 countries as being "PSI Participants."

Status: No formal mechanisms, characterized as an activity rather than an organization

Additional information: http://www.state.gov/t/isn/c10390.htm.

The Proliferation Security Initiative was first proposed on May 31, 2003. Since then the PSI has worked to restrict the proliferation of WMD through multilateral collaboration in military exercises and operations. From the commitment of eleven countries at its inception, the initiative has expanded to encompass more than 90 countries.

The Initiative aims to limit the flow of WMD through the application of existing national anti-smuggling laws while complying with the framework of international laws, which are much more restrictive on the issue of maritime interdiction. The goal is to stop shipments of WMD, their delivery systems, and related materials. In order to achieve this goal, states participating in the PSI have conducted several joint military exercises with a goal of practicing and improving search and seizure methods. While the PSI does "not create formal obligations," it does attempt to "represent a political commitment to establish 'best practices' to stop proliferation-related shipments."

While the primary aim of PSI is to limit the proliferation of WMD between non-participating states and nonstate actors, it does hold its members to the same standards and scrutiny, including compliance and cooperation with boarding arrangements. Compliance with UN Convention on the Law of the Sea (UNCLOS) provisions that ensure innocent passage has been the source of much controversy surrounding the PSI. Under UNCLOS, a nation's territorial waters, where its laws apply, extend twelve miles from the coast. Within this zone, weapons of all types may be confiscated, but only if the shipment is bound for known insurgents or terrorists. Beyond the 12 miles limit, a state cannot apply its laws to ships. UNCLOS does allow for interdiction on the high seas (beyond the 12 miles) if a ship is "suspected to be engaged in the slave trade, piracy, illegal broadcasting, or [does not fly] its flag".

b. PSI status in the Asia-Pacific

PSI participating states in the Asia-Pacific region are Australia, Brunei, Canada, Cambodia, Fiji, Japan, Marshall Islands, Mongolia, New Zealand, Philippines, Russia,

Singapore, South Korea, and the United States. A complete list of participating states can be found at: http://www.state.gov/t/isn/c27732.htm

5. Global Initiative to Combat Nuclear Terrorism

a. General Information

Established: 15 July 2006

Agreement on principles: 31 October, 2006

Partners: 75 countries and regional organizations

Status: Open to all states and regional organizations

Additional information: http://www.state.gov/t/isn/c18406.htm.

The Global Initiative to Combat Nuclear Terrorism is a joint initiative launched by the United States and Russia to "expand and accelerate the development of partnership capacity to combat the global threat of nuclear terrorism" and promote legitimate practices in peaceful nuclear energy activities. This initiative is open to partner nations who share the common goal of combating nuclear terrorism in an active and systematic way. The goals of the Global Initiative are to develop the international infrastructure and diplomatic foundations necessary to:

- Improve accounting, control, and physical protection of nuclear material and radioactive substances, as well as security of nuclear facilities;
- Detect and suppress illicit trafficking or other illicit activities involving such materials, especially measures to prevent their acquisition and use by terrorists;
- Respond to and mitigate the consequences of acts of nuclear terrorism;
- Ensure cooperation in the development of technical means to combat nuclear terrorism;
- Ensure that states takes all possible measures to deny safe haven to terrorists seeking to acquire or use nuclear materials; and
- Strengthen the respective national legal frameworks to ensure the effective prosecution of, and the certainty of punishment for, terrorists and those who facilitate such acts.

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The Global Initiative seeks to achieve its objectives by building the necessary state capacity and national capabilities to combat transnational threats of nuclear terrorism on an international level. According to the Global Initiative's joint fact sheet, the International Convention on the Suppression of Acts of Nuclear Terrorism, the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities, and UN Security Council Resolutions 1373 and 1540 provide the legal framework for this initiative. Unlike previous nuclear counterterrorism efforts, the Global Initiative goes "beyond interdiction" to operate inside the borders of countries with nuclear materials by

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setting protection and detection standards and jointly planning strategies to block terrorist efforts. Activities of the Global Initiative include "national efforts and could include *inter alia* multinational exercises, expert-level meetings to share best practices, and the provision of assistance from those nations in a position to offer such assistance to those nations requiring it."

One of the Global Initiative's main objectives has been to develop an international detection architecture that would be able to trace the movement of terrorist funds through cyberspace, create more flexible diplomatic relations with countries to jointly combat WMD terrorism, and increase interagency as well as public-private cooperation. Advocates for the initiative have called for the participation of local governments and the private sector in the participating countries, the strengthening of law enforcement, increased contingency planning, and sharing of information. As of July 2008, a total of 75 countries are partners in the initiative and the IAEA and European Union are observers.

b. Partner States in the Asia-Pacific

The U.S. and Russia are the founding members of the Initiative. Other partner states in the Asia-Pacific region are Australia, Cambodia, Canada, China, India, Japan, New Zealand, Palau, and South Korea.

6. Nuclear Suppliers Group (NSG)

a. General Information

Established:	1974
Initial guidelines:	1978
Participants:	45
Status:	Restricted membership
Additional information:	http://www.nuclearsuppliersgroup.org.

The Nuclear Suppliers Group was formed in 1974 in response to India's first nuclear weapons test. Since India first obtained nuclear materials and technology for building reactors for power generation, several suppliers noted the ease with which the capacity was modified to create nuclear weaponry. Thus, several nuclear supplier states formed a group to monitor the export of nuclear technologies and materials. The group was set up to place controls on exports of materials, equipment, and technologies that can be used in developing nuclear weapons. Since the aim of the group is to prevent nuclear weapon proliferation, it does not discourage nuclear research for energy needs and deter trade.

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Membership in the NSG is voluntary and includes politically binding agreements. There are rules that govern the necessary steps in handling certain nuclear exports. In 1978, the NSG published its first set of guidelines, which lists exports of nuclear materials and equipment that require IAEA safeguards at the recipient facility. In 1992, the group issued a second set of guidelines that identifies nuclear dual-use goods, for which it recommends careful supervision. The guidelines focus on three areas:

- recipient governments must apply safeguards and assure end use is not for making nuclear weapons;
- protection of nuclear materials and technologies;
- States must show caution in transferring "sensitive facilities, technology, and weapons-usable materials."

While the NSG has no power to enforce its guidelines, it does however publicly identify companies involved in the export of materials that it believes undermine the goals of nonproliferation. The power of enforcement is left to participating states. The IAEA also becomes involved when items indentified in the NSG guidelines are to be exported. Therefore, the NSG can be viewed more as an advisory group that flags suspected purchases and shipments, and alerts the pertinent groups to take appropriate actions.

The NSG has 45 members. Membership is dependent on whether or not a nation exports materials that appear in the guidelines. Before approval as a member, an applicant's history on proliferation, observance of nonproliferation treaties and agreements, and management of the export of strategic goods are evaluated to ensure compliance.

Nuclear Suppliers Group Membership

Argentina	Croatia	Hungary	Netherlands	South Africa
Australia	Cyprus	Ireland	New Zealand	South Korea
Astria	Czech Republic	Italy	Norway	Spain
Belarus	Denmark	Japan	Poland	Sweden
Belgium	Estonia	Kazakhstan	Portugal	Switzerland
Brazil	Finland	Latvia	Romania	Turkey
Bulgaria	France	Lithuania	Russia	Ukraine
Canada	Germany	Luxemborg	Slovakia	United Kingdom
China	Greece	Malta	Slovenia	United States

Source: http://www.nuclearsuppliersgroup.org/member.htm

7. Australia Group (AG)

a. General Information

Established: 1985

Members: 41

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Status: Limited, admission based on consensus of the existing members.

Additional information: http://www.australiagroup.net/en/index.html.

The Australia Group was formed in 1985 following a 1984 UN investigation revealed that Iraq had manufactured weapons used in the Iran-Iraq War after many Western countries had mistakenly supplied Iraq with dual-use chemicals. The original group was comprised of fifteen countries. In 1990 it expanded its mandate to include dual-use biological materials after it was discovered that Iraq was trying to develop biological weapons. While measures taken by the group are not legally binding, its influence is most felt in the commitment to nonproliferation.

The Australia Group uses licensing measures to monitor and control the spread of technologies and materials that are of use in developing chemical and biological weapons. All member states must have an effective and legally based system by which national exports can be controlled. The group attempts to stop the export of materials and elements that appear on its common control list, which includes six areas: chemical weapons precursors, dual-use chemical manufacturing facilities and equipment and related technology, dual-use biological equipment and related technology, biological agents, plant pathogens, and animal pathogens. The export licensing measures are designed to impede production of chemical and biological weapons and should not hinder normal trade of materials and equipment for non-weapon use. While the group cannot physically block the export of the materials on its list, it relies on the member governments to deny export licenses for listed materials.

The group originally had focused mainly on preventing these technologies from being used by other states, but recently has expanded its focus. In a 2002 meeting the group decided to also focus on preventing chemical and biological weapons from falling into the hands of terrorists, despite the original intent being set on states. The group has been accused by some of blocking economic and technological development in an effort to create a cartel to maintain a monopoly on chemical and biological materials.

b. Australia Group Membership

Argentina	Denmark	Ireland	New Zealand	Switzerland
Australia	Estonia	Italy	Norway	Turkey
Austria	European Commission	Japan	Poland	Ukraine
Belgium	Finland	South Korea	Portugal	United Kingdom
Bulgaria	France	Latvia	Romania	United States
Canada	Germany	Lithuania	Slovakia	
Croatia	Greece	Luxembourg	Slovenia	
Cyprus	Hungary	Malta	Spain	
Czech Republic	Iceland	Netherlands	Sweden	

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Source: **http://www.australiagroup.net/en/participants.html**

8. Zangger Committee

a. General Information

Established: 1971

Members: 37

Status: Limited, open to signatories of the NPT

Additional information: http://www.zanggercommittee.org/Zangger/default.htm

The Zangger Committee, also known as the "NPT Exporters Committee," was formed in 1971 to offer guidance on the implementation of Article 3, paragraph 2 of the NPT, which addresses the export of fissionable material. The Committee seeks to ensure that all materials requiring IAEA safeguards are properly controlled when exported to non-nuclear weapons states. This includes "source or special fissionable material, or equipment or material especially designed or prepared for the processing, use or production of special fissionable material." The Committee is relatively informal and does not hold members to legally binding agreements.

The Committee maintains a "trigger list" of materials used in generating nuclear power. The list includes source material and special fissionable material such as all forms of naturally occurring uranium isotopes, depleted uranium 235, and thorium. In order to be transported successfully, the recipient facility must be appropriately outfitted with the proper IAEA safeguards as a condition of supply. The Committee also established a list of nuclear power production equipment and materials that need IAEA safeguards. The items under this section of the guidelines include reactors as well as plants that reprocess irradiated fuel elements, separate isotopes of uranium, produce heavy water, and convert plutonium and uranium to fuel. While the Committee has no official enforcement powers, it often recommends courses of action, which includes economic sanctions against non-members that violate import criteria.

The Zangger Committee has been relatively free from major criticisms or controversies. One allegation in the 1970s was that the Committee attempted to limit less developed countries from obtaining the benefits of nuclear energy. Another criticism is that the decisions made by the Committee are non-binding for the members, with the scrutiny of trade being on non-members. Specifically, the imposition of economic sanctions has been criticized.

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b. Zangger Committee membership

Argentina	Czech Republic	Italy	Romania	Turkey
Australia	Denmark	Japan	Russia	Ukraine
Austria	Finland	South Korea	Slovakia	United Kingdom
Belgium	France	Luxembourg	Slovenia	United States
Bulgaria	Germany	Netherlands	South Africa	Kazakhstan
Canada	Greece	Norway	Spain	
China	Hungary	Poland	Sweden	
Croatia	Ireland	Portugal	Switzerland	

Source: http://www.zanggercommittee.org/Zangger/Members/default.htm

9. Container Security Initiative (CSI)

a. General Information

Established: 2002

Members: 58 operational ports

Status: Limited, through agreement with U.S. Department of Homeland Security

Additional information: http://cbp.gov/xp/cgov/trade/cargo_security/csi/

The U.S. Bureau of Customs and Border Protection (CBP), an agency of the Department of Homeland Security, launched the CSI program in 2002. Its purpose is to increase security for container cargo shipped to the United States. As terrorist organizations have turned to destroying economic infrastructure to make an impact on states, the vulnerability of international shipping has been highlighted. The initial CSI program focused on the top 20 ports shipping approximately two-thirds of the container volume to the United States. Participation is open to any port meeting certain volume, equipment, procedural, and information-sharing requirements. CSI consists of four core elements:

- Using intelligence and automated information to identify and target containers that pose a risk for terrorism.
- Pre-screening those containers that pose a risk at the port of departure before they arrive at U.S. ports.
- Using detection technology to quickly pre-screen containers that pose a risk.
- Using smarter, tamper-evident containers.

Under the CSI program, the screening of containers that pose a risk for terrorism is accomplished by teams of CBP officials deployed to work in concert with their counterparts at ports around the world. The CSI program offers participant countries the reciprocal opportunity to send their customs officers to major U.S. ports to target ocean-going, containerized cargo to be exported to their countries. In June 2002, the World

Customs Organization passed a resolution that will enable ports in all 161 of the member nations to begin to develop programs along the CSI model. On 22 April 2004, the EU and the U.S. signed an agreement to expand CSI throughout the European Community.

b. Membership

As of October 2008, there were 58 ports participating in CSI, accounting for 85 percent of container traffic bound for the U.S. including the following East Asian ports:

Singapore, Hong Kong, Shenzhen and Shanghai in China, Kaohsiung and Chi-Lung in Taiwan, Pusan in South Korea, Port Klang and Tanjung Pelepas in Malaysia, Laem Chabang in Thailand and Yokohama, Tokyo, Nagoya and Kobe in Japan. The complete list of ports included is available at:
http://www.dhs.gov/xprevprot/programs/gc_1165872287564.shtm

10. Megaport Initiative

a. General Information

Established: 2003

Membership: 39 with ongoing expansion planned to reach 75

Status: Ports selected by U.S. National Nuclear Security Administration

Additional information:
http://nnsa.energy.gov/nuclear_nonproliferation/1641.htm

The U.S. established the Megaports Initiative to screen containerized cargo as it moves through the global maritime shipping network for special nuclear and other radiological materials. To reduce the illicit trafficking of these materials, the Initiative provides and installs radiation detection systems at high-volume international seaports.

At ports, containers are screened through fixed-vehicle and rail radiation portal monitors as they leave the terminal. Other equipment typically provided includes hand-held personal radiation detectors, radioisotopic identifiers and radiation survey meters. Detectors must be able to distinguish between special nuclear materials, medical and industrial radioisotopes, and naturally occurring radiation. On detection of a smuggled shipment, the authorities and nuclear oversight bodies of the country concerned are alerted instantly so that they can take further action. Radiation alarms can be simultaneously transmitted to multiple agencies.

b. **Membership**

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Equipment has been installed at 19 ports including Bahamas, Belgium, Colombia, Dominican Republic, Greece, Honduras, Israel, the Netherlands, Oman, Pakistan, Panama, the Philippines, Spain, Singapore, South Korea (SFI Port), Sri Lanka, Thailand, and the United Kingdom. Implementation is underway at additional ports in Bangladesh, Belgium, China, Djibouti, Dubai–United Arab Emirate, Egypt, Hong Kong, Israel, Jamaica, Japan, Malaysia, Mexico, Oman, Panama, Portugal, Spain, and Taiwan.

11. Secure Freight Initiative

a. General Information

Established: 2006

Membership: 6 ports included in initial pilot program

Status: Ports chosen by U.S.

Additional information:
http://www.cbp.gov/xp/cgov/trade/cargo_security/secure_freight_initiative/

The Secure Freight Initiative is a joint initiative sponsored by the U.S. Department of Homeland Security and Department of Energy to build on the CSI and Megaport Initiative to enhance the ability to scan containers for nuclear and radiological materials. The initial phase of Secure Freight involves the deployment of a combination of existing technology and proven nuclear detection devices.

Containers arriving at participating seaports are scanned with both non-intrusive radiographic imaging and passive radiation detection equipment placed at terminal arrival gates. Optical scanning technology is used to identify containers and classify them by destination. Relay cargo – containers being moved from one ship to another – will also be inspected with such technology, as adapted in consultation with operators for the transshipment environment. The inspection tools will include the use of enhanced radiological detection technology. Data gathered on containers bound for the U.S. in ports participating in the Secure Freight Initiative will be transmitted in near real-time to U.S. Customs and Border Protection (CBP) officers working in overseas ports and to the DHS National Targeting Center. This data will be combined with other available risk assessment information such as currently required manifest submissions, to improve risk analysis, targeting and scrutiny of high-risk containers overseas. All alarms from the radiation detection equipment for any container will be resolved locally as is currently the case under the Megaports Initiative.

b. **Membership**

Equipment was initially installed at Port Qasim in Pakistan, Puerto Cortes in Honduras, Southampton in the United Kingdom, which are currently operational. Equipment has

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also been installed at certain terminals at Port Salalah in Oman, Hong Kong, Busan, Hong Kong.

12. Global Nuclear Energy Partnership (GNEP)

a. General Information

Established:	26 February 2006
Membership:	25 partners
Status:	Limited membership, by invitation of partners
Additional information:	http://www.gneppartnership.org/

The Global Nuclear Energy Partnership (GNEP) was announced as a core component of the U.S. Advanced Energy Initiative in 2006 to "expand safe, clean, reliable, affordable nuclear energy worldwide." The GNEP strategy has seven key elements: to expand the use of nuclear power in the U.S., develop advanced recycling technologies, properly dispose of and minimize nuclear waste, design advance burner reactors capable of producing energy from recycled nuclear fuel, lease nuclear fuel to developing nations while reducing the risk of proliferation, construct small scale proliferation resistant reactors for developing countries, and enhance nuclear safeguards. In addition to the stated goals, the successful implementation of GNEP could lead to positive externalities such as environmental sustainability and reduced world demand for oil.

According to the GNEP strategy, a select consortium of countries with advanced nuclear technologies would lease nuclear fuel and reactors to other nations seeking to develop nuclear power. Only these "supplier" nations would be allowed to enrich uranium and would ultimately take back the spent fuel for reprocessing and disposal. In return, the nations "renting" nuclear power would build smaller scale nuclear power plants and make a commitment to not seek nuclear fuel production facilities of their own (i.e. enrichment and reprocessing plants). When these countries return the spent fuel to the supplier nations, the fuel would be reprocessed using a yet-to-be-developed proliferation-resistant technology. Supplier nations would recycle the spent fuel without separating plutonium, the main fissile material necessary in the production of nuclear weapons, thus reducing the risk of nuclear proliferation. The remaining high-level waste, which would normally take thousands of years to decompose, would be transmuted into waste that can decompose in several hundred years.

Proponents of this initiative argue that GNEP will make emissions-free nuclear energy available to the world in a time of increasing energy demand while simultaneously keeping nuclear weapons out of the hands of terrorists. Critics have voiced a variety concerns about the initiative. Environmentalists have argued that GNEP seeks to utilize proliferation-resistant reprocessing technology for commercial reasons while ignoring delays with the already existing Yucca Mountain waste repository project. Others have

countered that GNEP will allow the U.S. to recycle the long-lived nuclear waste in Yucca Mountain that would have otherwise taken thousands of years to decompose. There are also political concerns regarding the supplier-receiver relationship of GNEP partner nations. Some receiver states have expressed concern that their reliance on nuclear fuel would subject them to external political pressure in the future. Critics also worry that GNEP creates unhealthy incentives for countries to rapidly develop costly new uranium enrichment programs based on their fear that GNEP will divide the world into "uranium-enriching (and fuel selling) haves and have-nots." There are also issues of feasibility and cost in this long-term venture. Critics have expressed concern that GNEP will waste limited funds on "excessively ambitious and unachievable technologies, and divert funding from other more important priorities, such as cleaning up domestic nuclear waste sites." Finally, critics have pointed out that despite the claim that GNEP will advance nonproliferation, the fuel service program may in fact weaken global nonproliferation efforts and increase the threat of nuclear terrorism because reprocessing technology would be renewed and developed in several countries.

b. Membership in GNEP

To date, there are 25 partner states participating in GNEP. The IAEA, the Generation IV International Forum, and EURATOM are permanent observers and have the responsibility of overseeing the operations of GNEP and ensuring that they meet international standards. Partner states from the Asia- Pacific region include Australia, Canada, China, Japan, South Korea and the United States. Vietnam is an observer state.

13. Six-Party Talks

a. General Information

Established: August 2003

Members: 6

Status: Limited to six countries

Additional information:
http://www.globalsecurity.org/wmd/world/dprk/6-party.htm.

The Six Party Talks began as a multilateral approach to peacefully resolving the North Korean nuclear threat that heightened after North Korea ousted IAEA inspectors in December 2002, withdrew from the Nuclear Nonproliferation Treaty (NPT) in January 2003, and restarted its plutonium enrichment program. According to a joint statement issued in Sep. 2005, the six parties "unanimously reaffirmed that the goal of the Six-Party Talks is the verifiable denuclearization of the Korean Peninsula in a peaceful manner." The following is a summary of the provisions included in the statement:

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- The DPRK committed to abandoning all nuclear weapons and existing nuclear programs and returning, at an early date, to the Treaty on the Non-Proliferation of Nuclear Weapons and to IAEA safeguards.

- The United States affirmed that it has no nuclear weapons on the Korean Peninsula and has no intention to attack or invade the DPRK with nuclear or conventional weapons.

- The ROK reaffirmed its commitment not to receive or deploy nuclear weapons in accordance with the 1992 Joint Declaration of the Denuclearization of the Korean Peninsula, while affirming that there exist no nuclear weapons within its territory.

- The 1992 Joint Declaration of the Denuclearization of the Korean Peninsula should be observed and implemented.

- The DPRK stated that it has the right to peaceful uses of nuclear energy. The other parties expressed their respect and agreed to discuss, at an appropriate time, the subject of the provision of light water reactor to the DPRK.

- The Six Parties undertook, in their relations, to abide by the purposes and principles of the Charter of the United Nations and recognized norms of international relations.

    - The DPRK and the United States undertook to respect each other's sovereignty, exist peacefully together, and take steps to normalize their relations subject to their respective bilateral policies.
    - The DPRK and Japan undertook to take steps to normalize their relations in accordance with the Pyongyang Declaration, on the basis of the settlement of unfortunate past and the outstanding issues of concern.

- The Six Parties undertook to promote economic cooperation in the fields of energy, trade and investment, bilaterally and/or multilaterally.

    - China, Japan, ROK, Russia and the US stated their willingness to provide energy assistance to the DPRK.
    - The ROK reaffirmed its proposal of July 12th 2005 concerning the provision of 2 million kilowatts of electric power to the DPRK.

- The Six Parties committed to joint efforts for lasting peace and stability in Northeast Asia.

    - The directly related parties will negotiate a permanent peace regime on the Korean Peninsula at an appropriate separate forum.

- The Six Parties agreed to explore ways and means for promoting security cooperation in Northeast Asia.

Subsequent rounds of talks have focused on finding an implementation process that is satisfactory to all sides of the talks. Although five separate working groups have been established within the framework of the talks, they have been inactive pending resolution of a variety of issues related to North Korean nuclear activity.

b. Participation

The six parties are China, United States, the Democratic People's Republic of Korea (North Korea), the Republic of Korea (South Korea), Russia, and Japan. China serves as the permanent Chair of the talks.

14. Asian Senior Talks on Proliferation

II. General Information

Established: November 2003

Membership: ASEAN countries, Australia, Canada, China, Japan, New Zealand, South Korea, United States

Status: Japan Ministry of Foreign Affairs Initiative. Fifth meeting in May 2008

The Asian Senior Talks on Proliferation was established by the Japanese Ministry of Foreign Affairs as a forum for exchanging views on non-proliferation and strengthening non-proliferation measures in Asian countries. Additional information is available at: http://www.mofa.go.jp/policy/un/disarmament/arms/psi/index.htmlhttp://www.mofa.go.jp/policy/un/disarmament/arms/psi/index.html

15. G8 Partnership against the Spread of Weapons of Materials of Mass Destruction

a. General information:

Established: 27 June 2002

Members: G8 member states, 13 contributing partners, and Ukraine

Status: Open to contributors and selected recipients countries

Additional information: http://cns.miis.edu/research/globpart/ http://consilium.europa.eu/cms3_fo/showPage.asp?id=1226&lang=EN&mode=g

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The G8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction is a comprehensive initiative that focuses on nonproliferation, disarmament, counterterrorism and nuclear safety issues. Priority is given to the destruction of chemical weapons, the dismantlement of decommissioned nuclear submarines, the disposition of fissile materials, and the employment of former weapons scientists.

The G8 action plan for the partnership calls for a commitment to the following six principles to prevent terrorists or those that harbor them from acquiring or developing WMD, missiles, and related materials, equipment, and technology:

Promote the adoption, universalization, full implementation and, where necessary, strengthening of multilateral treaties and other international instruments whose aim is to prevent the proliferation or illicit acquisition of such items; strengthen the institutions designed to implement these instruments.

Develop and maintain appropriate effective measures to account for and secure such items in production, use, storage and domestic and international transport; provide assistance to states lacking sufficient resources to account for and secure these items.

Develop and maintain appropriate effective physical protection measures applied to facilities which house such items, including defense in depth; provide assistance to states lacking sufficient resources to protect their facilities.

Develop and maintain effective border controls, law enforcement efforts and international cooperation to detect, deter and interdict in cases of illicit trafficking in such items, for example through installation of detection systems, training of customs and law enforcement personnel and cooperation in tracking these items; provide assistance to states lacking sufficient expertise or resources to strengthen their capacity to detect, deter and interdict in cases of illicit trafficking in these items.

Develop, review and maintain effective national export and transshipment controls over items on multilateral export control lists, as well as items that are not identified on such lists but which may nevertheless contribute to the development, production or use of nuclear, chemical and biological weapons and missiles, with particular consideration of end-user, catch-all and brokering aspects; provide assistance to states lacking the legal and regulatory infrastructure, implementation experience and/or resources to develop their export and transshipment control systems in this regard.

Adopt and strengthen efforts to manage and dispose of stocks of fissile materials designated as no longer required for defense purposes, eliminate all chemical weapons, and minimize holdings of dangerous biological pathogens and toxins, based on the recognition that the threat of terrorist acquisition is reduced as the overall quantity of such items is reduced.

The G8 works in partnership, bilaterally and multilaterally, to develop, coordinate, implement and finance, according to their respective means, new or expanded

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cooperation projects to address nonproliferation, disarmament, counterterrorism, and nuclear safety (including environmental) issues, with a view to enhancing strategic stability, consonant with our international security objectives and in support of the multilateral non-proliferation regimes.

Each country has primary responsibility for implementing its non-proliferation, disarmament, counter-terrorism and nuclear safety obligations and requirements and commits its full cooperation within the Partnership.

Cooperation projects under this initiative will be decided and implemented, taking into account international obligations and domestic laws of participating partners, within appropriate bilateral and multilateral legal frameworks.

b. Membership

The Global Partnership includes the G8 (Canada, France, Germany, Italy, Japan, Russia, UK, U.S.), the European Union and a total of 13 other donor Ssates (Finland, Norway, Poland, Sweden, Switzerland, the Netherlands, Australia, Belgium, the Czech Republic, Denmark, Ireland, New Zealand, and the Republic of Korea). Russia has been joined as a recipient by Ukraine.

17. Seven Nation Initiative (7NI)

a. General Information

Established: 2005

Membership: Australia, Chile, Indonesia, Norway, Romania, South Africa, and United Kingdom

Status: Open to interested states

Additional information: http://www.7ni.mfa.no/

The 7-Nation Initiative (7NI) was formed in an effort "to promote consensus after the divisive 2005 NPT Review Conference" and seeks "to strengthen commitment to and implementation of non-proliferation and disarmament commitments by building on the ongoing national efforts of each of its members." The 7NI was launched with a joint political statement that was endorsed by almost 100 states at the 2005 UN World Summit. Significantly, unlike similar groupings of "like-minded states" formed previously (eg. the New Agenda Coalition), the 7NI includes among its membership a nuclear weapon state, (the United Kingdom). Norway has been a leading nation in the 7NI. In addition to hosting its website at the Norwegian Foreign Ministry, Norway has committed many millions of dollars to research and initiatives on nuclear disarmament and non-proliferation under 7NI auspices.

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The 7NI has a range of research, information sharing and political outreach programs. Through bilateral and plurilateral collaborations, its member states, as well as non-governmental organizations within these states, have hosted conferences, seminars and workshops on a range of nuclear security issues including nuclear disarmament, nonproliferation, export controls, UN Security Council Resolution 1540, a Middle East Nuclear Weapon Free Zone, highly-enriched uranium (HEU) security and achieving a nuclear weapon free world.

One key element of the 7NI was the establishment of its website as an information clearinghouse *"to facilitate the exchange of information and identify further areas for cooperation."* The website : http://www.7ni.mfa.no/ showcases the national efforts of 7NI members in areas such as education, research, advocacy and technical cooperation and assistance. It also consolidates and shares lessons learned from the activities of 7NI.

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Chapter 7
Cooperation and Assistance for National Capacity Building

Technical assistance in building national capacity and enhancing international cooperative efforts for the purpose of preventing proliferation of WMD components and technology is available from a variety of official and unofficial sources. This chapter identifies the organizations and programs that provide assistance in building national capacity to combat WMD proliferation and information on issues related to disarmament and preventing proliferation. While the IAEA and the UN have played important roles in leading the multilateral effort on disarmament and nonproliferation, regional organizations, individual states, and non-governmental organizations are playing an increasingly important role in augmenting these organizations.

In the first part of the chapter, international organizations that play a major role in organizing and coordinating initiatives aimed at improving oversight and implementing specific aspects of the global WMD nonproliferation regime are included.

The second part of the chapter covers a variety of national-level programs. While the preponderance of the programs have been undertaken by the U.S., other states have also taken the initiative to establish outreach programs that provide training and capacity building for those requesting assistance. An innovation that has occurred with the establishment of the UN Security Council Resolution 1540 Committee is the creation of a central clearinghouse for a wide range of national-level assistance programs that previously had been undertaken in an ad hoc fashion. As the 1540 Committee becomes more institutionalized, it is expected to take on an increasingly important role as the focal point for coordinating assistance.

The third part of the chapter focuses on several nongovernmental organizations that have provided education and training on various aspects of nonproliferation and disarmament. The criteria for being included in the list are that the organizations provide specific training and assistance in improving national capacity for more effectively implementing nonproliferation initiatives, offer educational materials on the key issues related to WMD, and information on the status of nonproliferation treaties, protocols and other implementing agreements.

International Governmental Organizations

1. International Atomic Energy Agency

The IAEA, although not referred to in Article 4 of the NPT, plays a major role in planning and implementing multilateral cooperation stipulated in the Treaty with regard to the peaceful use of nuclear energy. It encourages and assists research, development and application of atomic energy; it provides technical advice, training, materials, services and equipment; it fosters exchange of scientific and technical information; it

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develops standards; and it establishes guidelines for the appropriate utilization of nuclear technology and materials. All these activities are related to key statutory functions of the IAEA. Its role in promoting cooperation in nonproliferation has come to the fore in recent years as comprehensive safeguards have played an increasingly important role in controlling access to fissile materials.

Its work is divided into three main areas: promoting safeguards and verification, promoting safety and security, and promoting science and technology.

In promoting safeguards and verification, it serves as the world´s nuclear inspectorate. Inspectors work to verify that safeguarded nuclear material and activities are not used for military purposes. It inspects nuclear and related facilities under safeguards agreements with more than 145 states around the world. Most agreements are with states that have internationally committed themselves not to possess nuclear weapons. These agreements are concluded pursuant to the NPT, for which the IAEA is the verification authority.

In promoting safety and security, the IAEA helps countries to upgrade nuclear safety and to prepare for and respond to emergencies. Work is keyed to international conventions, standards and, guidance. The main aim is to protect people and the environment from harmful radiation exposure.

More information on the full scope of programs administered by the IAEA can be found at their website: http://www.iaea.org/index.html.

2. World Customs Organization

In recognition of the threat of terrorist use of WMD, the World Customs Organization has endorsed a strategy to secure the movement of global trade in a way that does not impede but, on the contrary, facilitates the movement of that trade. WCO members have developed a regime known as the WCO SAFE Framework of Standards, which sets forth the principles and the standards and presents them for adoption as a minimal threshold of what must be done by WCO members.

The SAFE Framework consists of four core elements. First, it harmonizes the advance electronic cargo information requirements on inbound, outbound and transit shipments. Second, each country that joins the SAFE Framework commits to employing a consistent risk management approach to address security threats. Third, it requires that at the reasonable request of the receiving nation, based upon a comparable risk targeting methodology, the sending nation's Customs administration will perform an outbound inspection of high-risk containers and cargo, preferably using non-intrusive detection equipment such as large-scale X-ray machines and radiation detectors. Fourth, the SAFE Framework defines benefits that Customs will provide to businesses that meet minimal supply chain security standards and best practices.

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The four core elements rest on the twin pillars of Customs-to-Customs network arrangements and Customs-to-Business partnerships. The pillars involve a set of standards that are consolidated to guarantee ease of understanding and rapid international implementation. Accordingly, the WCO is actively engaged with both Customs administrations and the business community in implementing the SAFE Framework. It is working on capacity building initiatives and raising awareness, particularly among Customs administrations.

The WCO SAFE Framework of Standards is available at the WCO website: http://www.wcoomd.org/files/1.%20Public%20files/PDFandDocuments/SAFE%20Framework_EN_2007_for_publication.pdf.

3. Organization for the Prevention of Chemical Weapons

The Organization for the Prohibition of Chemical Weapons (OPCW) is the implementing body of the Chemical Weapons Convention (CWC or Convention). The OPCW is given the mandate to achieve the object and purpose of the Convention, to ensure the implementation of its provisions, including those for international verification of compliance with it, and to provide a forum for consultation and cooperation among states Parties. The Technical Secretariat of the OPCW is responsible for the day-to-day administration and implementation of the Convention, including inspections, while the Executive Council and the Conference of the states parties are decision-making organs designed primarily to determine questions of policy and resolve matters arising between the states parties on technical issues or on interpretations of the Convention. The chairs of the Executive Council and the Conference are appointed by each body's membership. The Technical Secretariat is headed by a Director-General, who is appointed by the Conference on the recommendation of the Council. Key components of the organization include:

Conference of the States Parties
The Conference of the States Parties is the main policy-making organ of the OPCW. Composed of all member states, the Conference meets annually as well as in special session when necessary.

Executive Council
The Executive Council is comprised of the representatives of 41 member states, who are elected by all other OPCW Member States to serve two-year terms. The Executive Council usually meets four times per year, and more frequently in meetings and informal consultations, to take policy decisions that enable the OPCW to function.

Technical Secretariat
The Technical Secretariat assists the Conference of States Parties and the Executive Council and has a staff of about 500 people. It carries out the daily work of implementing the Convention, including conducting inspections.

Subsidiary Bodies

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The Convention also provides for the establishment of three subsidiary bodies to aid the three main organs of the OPCW in their work: the Scientific Advisory Board, the Advisory Body on Administrative and Financial Issues, and the Confidentiality Commission.

Additional information on the OPCW is available on its website at: http://www.opcw.org.

4. United Nations Office of Disarmament Affairs

The Department of Disarmament Affairs was established in January 1998. It was originally established in 1982 upon the recommendation of the General Assembly's second special session on disarmament and in 2007 it was changed to the United Nations Office for Disarmament Affairs (UNODA).

The Office promotes the goal of nuclear disarmament and non-proliferation and the strengthening of the disarmament regimes in respect to other weapons of mass destruction, chemical and biological weapons. It also promotes disarmament efforts in the area of conventional weapons, especially land mines and small arms.

UNODA provides substantive and organizational support for the norm-setting in the area of disarmament through the work of the General Assembly and its First Committee, the Disarmament Commission, the Conference on Disarmament and other bodies. It fosters preventive disarmament measures, such as dialogue, transparency and confidence building on military matters, and encourages regional disarmament efforts. These include the United Nations Register of Conventional Arms, regional forums, disarmament education, full texts of disarmament treaties, and other data bases and publications dealing with disarmament issues.

Additional information on the UNODA is available on its website at: http://www.un.org/disarmament.

5. United Nations Security Council Resolution 1540 Committee

When United Nations Security Council Resolution (UNSCR) 1540 on non-proliferation was adopted in 2004, the Council established a special Security Council Committee to promote implementation of the resolution and build national capacity to prevent the proliferation of WMD. The 1540 Committee works with states as a clearinghouse (using the information it has collected from states), assists states in meeting their 1540 obligations, and ensures that existing assistance programs have the most widespread availability for states to access. The scope of the obligations outlined in UNSCR 1540 has made the 1540 a central part of the international effort in preventing proliferation.

Operative paragraph 7 of UNSCR 1540 obliges capable states to recognize that some states lack the capacity to comply with provisions of the Resolution and offer assistance. It also obliges those states that require assistance to request it. The Committee recognizes that technical assistance for implementing UNSCR 1540 is a long term issue, given the

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comprehensive requirements and political issues involved. The resolution requires that states outline in their reports offers of assistance, details of assistance measures in place, and point of contact details to facilitate the accommodation of requests. Assistance offers have also been made by a number of international organizations and other relevant arrangements, which can be viewed on the UNSCR 1540 Committee website at http://www.un.org/sc/1540/relevantassistance.shtml. Below is a summary of the current offers of assistance that have been articulated in individual Asia-Pacific ountry reports in response to operative paragraph 7:

	Assistance offered	**Assistance in place**	**Point of contact given**	**Assistance Requested**
Australia	•	•		
Brunei				
Cambodia				•
Canada	•	•		
China	•	•		
India	•	•		
Indonesia				
Japan	•	•		
Laos				
Malaysia	•			
Mongolia				
Myanmar				
New Zealand	•	•		
North Korea	*No Report*			
Philippines				•
Russian Federation	•	•	•	
Singapore		•		
South Korea		•	•	
Thailand				•
Timor Leste				
United States	•	•	•	
Vietnam				
Pacific Island States				
Cook Islands	*No Report*			
Fiji	*Report not publically available*			
Kiribati				•
Marshall Islands, Rep. Of				•
Micronesia, Fed. States	*No Report*			
Nauru				

Niue	*No Report*			
Palau	*Report not publically available*			
Papua New Guinea				
Samoa				•
Solomon Islands	*No Report*			
Tonga	*Report not publically available*			
Tuvalu				•
Vanuatu				•

National Reports: http://www.un.org/sc/1540/nationalreports.shtml
Requests for assistance: http://www.un.org/sc/1540/requestsforassistance.shtml
Offers of Assistance: http://www.un.org/sc/1540/memberstatesassistance.shtml

National Programs

1. United States

The U.S. has several agencies that are actively engaged in outreach programs and offer assistance in the interest of improving accountability, controlling access and preventing the proliferation of WMD-related materials. While many of these programs were established in the context of the dissolution of the Soviet Union in the early 1990s many of the programs have expanded their scope to a more global perspective. The emphasis on improving homeland security in the U.S. following the events of Sep. 11, 2001 also led to the establishment of several new programs aimed at reducing the threat of WMD-related terrorist attack on the U.S. homeland.

The two primary agencies involved in outreach and assistance programs are the Department of Energy's National Nuclear Security Agency (NNSA) and the Department of Defense's Defense Threat Reduction Agency (DTRA). To gain a full appreciation of the scope of activities and for additional information on programs sponsored by these agencies please refer to their websites:
NNSA: http://nnsa.energy.gov/
DTRA: http://www.dtra.mil/

Below is a partial list of programs that are relevant to the Asia-Pacific region. It should be noted that we have not included several programs that are specifically focused on U.S.-Russian cooperation aimed at eliminating WMD-related materials and capabilities from facilities established by the Soviet Union.

Global Threat Reduction Initiative

a. Established: 11 February 2004

b. Sponsor: U.S. initiative in coordination with IAEA

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The U.S. announced the Global Threat Reduction Initiative (GTRI) as part of its effort to combat the spread of WMD. The mission of the GTRI is to remove and/or secure high-risk nuclear and radiological materials and equipment around the world that pose a threat to the international community. It is a consolidation and/or integration of many existing Department of Energy nuclear material efforts under the auspices of the National Nuclear Security Administration. The GTRI focuses on facilities that contain high-risk fissile material and other radiological materials and has three primary subprograms to accomplish its objectives:

- The Highly Enriched Uranium Reactor Conversion subprogram supports the conversion of domestic and international research reactors from the use of WMD HEU to LEU, in an effort to reduce or eliminate the usage and availability of HEU.

- The Nuclear and Radiological Material Removal subprogram supports the removal or disposal of excess WMD-usable nuclear and radiological materials, which is primarily a result of cooperation between U.S. and Russian removal efforts.

- The Nuclear and Radiological Material Protection subprogram supports the protection and security of WMD-usable nuclear and radiological materials worldwide from theft or sabotage.

To better address removal efforts, this Initiative also provides for a newly formed Global Materials Recovery Team (GMRT). The GMRT prepositions equipment and designates personnel for urgent nuclear materials recovery operations. Additional information is available at:
http://www.energy.gov/media/ViennaGTRFactSheetFINAL1052604.pdf.
http://www.whitehouse.gov/omb/expectmore/summary/10003239.2006.html.
http://www.iaea.org/NewsCenter/News/2004/GTRI_Initiative.html.

International Export Control Program

a. Established: 2001

b. Sponsor: U.S. NNSA

The International Export Control Program (IECP) establishes partnerships with technical agencies, institutes, and organizations of cooperating governments to support government outreach efforts to promote awareness of national export control requirements, and to enhance the ability of enforcement personnel, primarily customs officers, to recognize and interdict strategic commodities. This cooperation focuses on strengthening three critical components of effective export control systems in partner countries: enterprise compliance, licensing analysis, and enforcement. Additional information is available at:

http://nnsa.energy.gov/nuclear_nonproliferation/international_export_control_cooperation.htm

Reliable Fuel Supply

a. Established: February 2004

b. Sponsor: U.S. NNSA

The Reliable Fuel Supply (RFS) program is a U.S. Presidential initiative aimed at closing the Nuclear Non-Proliferation Treaty "loophole" by restricting the spread of sensitive enrichment and reprocessing technologies and assuring reliable access to the commercial nuclear fuel market. The program calls for the U.S. Department of Energy to set aside 17.4 metric tons of highly enriched uranium (HEU) to be blended down into low enriched uranium (LEU) for use in a reserve. This RFS will be used only in case of a fuel supply emergency for eligible countries that meet certain nonproliferation criteria. Additional information is available at:
http://nnsa.energy.gov/nuclear_nonproliferation/presidential_initiatives.htm

International Nuclear Safeguards and Engagement Program

a. Established: 1982

b. Sponsor: U.S. NNSA

The International Nuclear Safeguards and Engagement Program (INSEP) provides expertise on the peaceful uses of nuclear science and technology and nuclear infrastructure preparedness. The program seeks to assist cooperating nations in meeting the technical requirements associated with civilian nuclear power development in a manner that promotes international nonproliferation norms. Through INSEP, scientists from national laboratories in the U.S. work with their international counterparts, exchanging information on subjects ranging from radiation protection and health physics to radioactive waste management, research reactor optimization, radioisotope production, neutron activation, and emergency response protocols.

Countries that have participated in this program include Algeria, Argentina, Egypt, Libya, Morocco, Peru, Romania, Thailand, and Vietnam. Five national laboratories from the U.S, participate: Lawrence Livermore, Los Alamos, Sandia, Oak Ridge, and Argonne. Universities such as the University of Texas at Austin, University of California at Davis, Texas A&M University, Massachusetts Institute of Technology, and University of Missouri also contribute.

International Material Protection and Cooperation Program

a. Established: 1994

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b. Sponsor: U.S. NNSA

The International Material Protection and Cooperation (IMPC) program is designed to improve the security of vulnerable stockpiles of nuclear weapons and weapons-usable nuclear material in countries of concern and for improving the ability to detect the illicit trafficking of those materials.

IMPC began as a task force to mitigate the security vulnerabilities of special nuclear material arising from the dissolution of the Soviet Union. Since that time, the program has evolved into a global effort, engaging over 40 countries to deny terrorists the vital materials needed to engage in acts of nuclear terror.

The IMPC program employs a two-tiered strategy: The First Line of Defense improves the security of nuclear weapons and materials at their source, through material protection, control and accounting. The Second Line of Defense strengthens the capability of foreign governments to deter, detect, and interdict illicit trafficking in nuclear and other radioactive materials across international borders and through the global maritime shipping system. IMPC works collaboratively with foreign partners to equip border crossings, airports and seaports with radiation detection equipment. Additional information is available at:
http://nnsa.energy.gov/nuclear_nonproliferation/Office%20of%20Int%27l%20Material%20Protection%20&%20Cooperation.htm

BioSecurity Engagement Program

a. Established: 2006

b. Sponsor: U.S. State Department

The BioSecurity Engagement (BEP) Program addresses the emerging global biological threats posed by terrorist threats outside traditional state-sponsored WMD programs. Working with multiple offices in the Department of State and other U.S. government agencies, BEP has begun engagement of priority countries in Southeast Asia, funding threat assessments, trainings, and outreach that strengthen global pathogen security and laboratory biosafety. One aspect of the program has involved establishing a pathogen security working group that will coordinate the U.S. government approach to global pathogen security. Additional information on the program is available at:
http://www.bepstate.net/

Export Control and Border Security Program

a. Established: 2004

b. Sponsor: U.S. Department of State

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The Export Control and Related Border Security (EXBS) program provides training, technical consultation, and equipment to establish and implement effective export and border controls that meet international standards. Drawing on the expertise from the Departments of State, Homeland Security, Commerce, and Energy as well as the private sector, the EXBS program has worked with countries around the world to enhance their ability to prevent and interdict shipments of dangerous items and technology. The EXBS program assists governments in strengthening their export controls by improving their legal and regulatory frameworks, licensing processes, border control and investigative capabilities, outreach to industry, and interagency coordination. A customized software program called TRACKER, enables the program help other countries' export control officials network via a standardized database with licensing officials in other countries.

2. Norway/United Kingdom

a. Established: 2007

b. Sponsor: Verification Research, Training and Information Centre (VERTIC)

The United Kingdom, Norway and the Verification Research, Training and Information Centre (VERTIC), a London-based NGO, established this joint research project on nuclear disarmament verification to *"to develop new technologies, methods and procedures for the verification of future multilateral and bilateral nuclear disarmament treaties."* The project is seeking proliferation-proof ways to check that nuclear warheads have been destroyed when a commitment has been made to their destruction.

The research being conducted is scientific and technical in nature. One device being investigated is a tool to allow inspectors to check that nuclear materials and weapons are indeed where they are declared to be, without revealing nuclear weapon designs. Other areas to be explored may include the development of reliable tags and seals for decommissioned equipment and materials, and permanent monitoring systems for nuclear facilities and storage spaces.

3. South Korea

Civilian Nuclear Facility Operations Training

a. Established: N/A

b. Sponsor: Korea Institute for Nuclear Nonproliferation and Control

The Korea Institute for Nuclear Nonproliferation and Control Department of External Affairs conducts a number of workshops, training seminars and conferences dealing with nonproliferation and civilian nuclear facility operations.

Nongovernmental Organizations

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Another important source of information on nonproliferation initiatives and disarmament are non-governmental organizations. Below is a summary of the major organizations that provide a wide range of information and, in some cases, provide advocacy for particular approaches for dealing with the WMD proliferation.

Acronym Institute for Disarmament Diplomacy (http://www.acronym.org.uk)
The Acronym Institute for Disarmament Diplomacy works to promote effective approaches to international security, disarmament, and arms control. Engaging with governments and civil society, Acronym provides reporting, analysis and strategic thinking on a range of issues relevant to peace and security, with special emphasis on treaties and multilateral initiatives.

ALSOS Digital Library for Nuclear Issues (http://alsos.wlu.edu)
The ALSOS website offers an internet based library with sources pertaining to nuclear studies. It categorizes its resources into fields from the science behind nuclear weapons to the political and international implications of the new age of nuclear warfare.

Arms Control Association (http://www.armscontrol.org)
The Arms Control Association (ACA) promotes public understanding of and supports for effective arms control policies. Through its public education and media programs and its magazine, *Arms Control Today (ACT),* ACA provides policy-makers, the press and the interested public with information, analysis and commentary on arms control proposals, negotiations and agreements, and related national security issues.

Bulletin of the Atomic Scientists (http://www.thebulletin.org)
The Bulletin of the Atomic Scientists informs the public about threats to the survival and development of humanity from nuclear weapons, climate change, and emerging technologies in the life sciences.

Carnegie Endowment for International Peace Nonproliferation Program (http://www.carnegieendowment.org/npp)
The Carnegie Nonproliferation Program website provides various articles and resources published by the Carnegie Foundation. The website also has many case-specific articles on disarmament and nonproliferation and offers expert analysis about current events pertaining to WMD and related technology.

Canadian Coalition for Nuclear Responsibility (http://www.ccnr.org)
CCNR is a not-for-profit organization that offers education and research on nuclear energy with specific emphasis on those issues pertaining to Canada.

Center for Arms Control, Energy and Environmental Studies (http://www.armscontrol.ru)
The Center for Arms Control, Energy and Environmental Studies is a part of the Moscow Institute for Peace and Technology, which focuses on acting as a vehicle for publication

on products and resources related to WMD issues and environmental studies. Most content is in Russian including a course in nonproliferation and WMD reduction regime.

Center for International Trade and Security (CITS)
(http://www.uga.edu/cits/strattrademain.html)
The strategic trade control program at CITS located at the University of Georgia in the U.S. focuses on controlling proliferation-related trade. The strategic trade control program includes research, outreach, and training projects to strengthening export controls.

Global Security Initiative (http://www.gsinstitute.org) The Global Security Institute focuses on strengthening international cooperation and security based on the rule of law, with a particular focus on nuclear arms control, non-proliferation, and disarmament. The site includes information on the Bipartisan Security Group, Disarmament and Peace Education, Middle Powers Initiative, and Parliamentarians for Nonproliferation and Disarmament.

Global Zero (www.globalzero.org) Global Zero is an international campaign that combines high-level policy work with international public outreach efforts to gain a commitment to eliminate nuclear weapons through phased and verified reductions. Launched in December 2008 in Paris, the first major initiative of the campaign was to commission an independent opinion poll in 21 countries on the issue of nuclear weapons, which found that public opinion in all 21 countries favored an international agreement to eliminate nuclear weapons. Participants are developing the 'Global Zero Action Plan,' which is a roadmap for the elimination of nuclear weapons. Key steps envisaged include deep reductions to Russian-U.S. arsenals followed by all nuclear weapons states cutting arsenals to zero in a phased and verified manner. Finally, Global Zero seeks to help establish verification systems and international management of the nuclear fuel cycle to prevent the future development of nuclear weapons.

International Commission on Nuclear Non-Proliferation and Disarmament (www.icnnd.org) The International Commission on Nuclear Non-Proliferation and Disarmament (ICNND), first proposed by Australian Prime Minister Kevin Rudd, was established in July 2008. It is co-chaired by the former Foreign Ministers of Australia and Japan, Gareth Evan and Yoriko Kawaguchi. ICNND aims "to reinvigorate international efforts on nuclear non-proliferation and disarmament, in the context of both the 2010 Nuclear Non-Proliferation Treaty Review Conference, and beyond." The Commission comprises an international panel of 15 eminent persons from military, political and academic backgrounds, which is augmented by high-level 'advisers.' ICNND has commissioned a series of research papers from commissioners and advisers on a range of topics including nuclear disarmament, no-proliferation, missiles and civil nuclear energy, as well as a bibliography of recent publications relevant to nuclear issues. These are available on the ICNND website.

Institute for Science and International Security (http://www.isis-online.org) ISIS is dedicated to informing the public about science and policy issues affecting international

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security. Its efforts focus on stopping the spread of nuclear weapons, bringing about greater transparency of nuclear activities worldwide, and achieving deep reductions in nuclear arsenals. ISIS produces technical assessments of efforts by states to get nuclear weapons. The site provides extensive satellite imagery of various nuclear sites and information on global stocks of nuclear materials.

James Martin Center for Nonproliferation Studies (http://www.cns.miis.edu)
The James Martin Center for Nonproliferation Studies (CNS) offers training for nonproliferation specialists and disseminates information and analysis. The website offers free access to the journal *Nonproliferation Review*, extensive commentary on nonproliferation issues, and summaries of WMD-related treaties and regimes.

NGO Committee on Disarmament, Peace and Security (http://disarm.igc.org)
The Non-Governmental Organization (NGO) Committee on Disarmament, Peace and Security provides services and facilities to citizens' groups concerned with the peace and disarmament activities of the United Nations. The Committee is viewed as a primary ally of the international movement for arms control and provides detailed information on UN activities and programs. The website includes a link to the journal *Disarmament Times*.

Nuclear Threat Initiative (http://www.nti.org)
NTI is engaged in developing and implementing projects to reduce the dangers from nuclear, biological and chemical weapons. The website has extensive news coverage of WMD-related topics and has a comprehensive database that provides analysis of UNSCR 1540. It also includes in-depth country profiles of WMD and missile development programs, which includes chronologies, maps, facility descriptions, and assessments.

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Chapter 8
Export Controls

Comprehensive measures to control the trade of strategic goods, covering all forms of transfer, are critical to the success of global nonproliferation efforts. Effective controls prevent the illicit flow of WMD-related commodities, while serving as a confidence building measure for facilitating trade, economic growth, and development. They also help keep WMD out of criminal or terrorist hands. Building national capacities is a priority that requires the participation of specialists from governmental and non-governmental sectors to identify and implement best practices. Several of the plurilateral initiatives included in Chapter 6 are directly related to implementing more effective controls on trade of strategic goods.

This chapter outlines a regional export control template and identifies "best practices" necessary for effective export controls. It promotes regional information sharing and encourages countries to harmonize national standards with international norms. Regional export control (XC) efforts should be guided by the following principles:

- Regulating the transfer of nuclear, chemical, radiological, biological, and missile-related technology and commodities contributes to common security.

- Comprehensive export controls are fundamental to ensuring the security of global trade. Because of increasing globalization, effective export controls are only possible on the basis of regional and broader international cooperation.

- An effective XC regime should be based upon a common set of export control elements that can be applied to an integral list of controlled items. These elements include, inter alia, comprehensive legislation, effective licensing procedures and enforcement, and industry outreach, with appropriate incentives and penalties.

- Regional XC cooperation requires the sharing of national information on XC policies, the current state of implementation, and future priorities, plus the development of mutually supportive confidence building measures and assistance programs.

- XC best practices that can be applied to the development and implementation of national standards should be identified and utilized. National and regional cooperative XC efforts should be consistent and mutually supportive.

- The private sector must be an integral part of any XC regime and should bear a social responsibility to meet common security needs.

- While serving the objective of nonproliferation, export controls should not hamper legitimate commerce (including the peaceful use of dual-use technology).

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An effective management regime for strategic goods should be based upon a common set of elements. These elements include, *inter alia*, comprehensive legislation, effective procedures for licensing and enforcement, associated incentives and penalties, fostering good inter-ministry cooperation as well as mandatory and sustained outreach to industry. CSCAP has developed a comprehensive set of recommendations and has published them in CSCAP Memorandum #14, Guidelines on Managing Trade of Strategic Goods.

Evaluating the implementation of an export control program is critical to its success. Finding the right balance among the various aspects of an effective program while promoting exports requires careful consideration of the requirements. Below is a template matrix that enables users to evaluate progress made in the areas of legal bases and licensing, enforcement, government-industry relations, and regime adherence (vertical axis) in terms of laws and regulations, institutional development, and processes (horizontal axis). An additional optional category included on the horizontal axis is the status of implementation measured in each case by evidence of activity. The matrix was developed by Dr. Seema Gahlaut and Dr. Anupam Srivastava drawing on methodology from the Center for International Trade and Security, University of Georgia and has been incorporated into the CSCAP Memorandum #14.

Template to Tabulate EC Implementation

	Laws & Regulations	**Institutions**	**Processes**	**Implementations (optional)**
Legal Bases & Licensing	- Acts - Lists	- Agencies - Jurisdiction - Coordination - Training	- Licensing Process - Requirements	Evidence of activity
Enforcement	- Acts - Authority for actions	- Agencies - Jurisdiction - Coordination - Training	- Enforcement procedures - Penalties - Risk-analyses	Evidence of activity
Govt-Industry relations	- Provisions to inform - Provision to review compliance	- Mechanisms for infor-sharing, advice, consultation	- Extent of the institutionalization of contact	Evidence of activity
Regime Adherence	International obligations incorporated into law?	Agencies designated to monitor compliance?	- Responsiveness - Contribution to the regimes	Evidence of activity

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Chapter 9
Nuclear Energy and Security

Peaceful use of nuclear energy is enshrined in the NPT along with the commitments to disarmament and nonproliferation. Nuclear energy offers opportunities for diversifying energy supply and ensuring its long-term security. Once the technology is transferred, if needed, nuclear power plants provide a largely or entirely domestic supply of energy. As a result, many countries consider nuclear energy as a key policy option for improving energy security. The immediate challenge is to ensure the nuclear fuel cycle within these countries is safeguarded from diversion to weapons programs and is proliferation resistant.

The primary resource material for nuclear power is natural uranium, which is widely available in the world, including in many countries where geopolitical risk is limited. Its cost represents only a few percent of the total cost of generating nuclear electricity and therefore uranium price volatility is not a major concern for nuclear power plant owners/operators. Furthermore, maintaining strategic stockpiles representing several years of consumption is physically easy and does not represent a significant financial burden for users.

The various stages of the fuel cycle present different degrees of security of supply. Some, such as fabrication and transport, are provided by a wide range of suppliers ensuring security and competitive prices. For others, such as enrichment and reprocessing, the number of suppliers is more limited and the competition less effective. However, there has been no example of supply disruption or signs of risk in this field among countries that have relied on nuclear power.

In countries where a large number of standardized reactors are in operation, generic safety problems or changes in safety regulations could require shutting down nuclear power plants for refurbishment and upgrade. However, operators have been able in the past to meet strengthened safety standards without jeopardizing reliability and security of electricity supply.

The international safeguards regime aimed at preventing diversion or proliferation of fissile materials creates some constraints on nuclear fuel markets associated with declaration, controls, and verification of the peaceful uses of nuclear materials. The framework implemented under the auspices of the IAEA does provide, however, a well-defined set of stable rules. Within this framework, complemented by national laws and regulations, nuclear materials for peaceful uses can be traded freely between countries and operators.

Ensuring the reliable provision of fuel cycle services such as reactor fuel supplies, storage of spent fuel, and final disposition of waste are key aspects of ensuring fuel cycle security. In recent years, a variety of proposals have been put forward to multilateralize the fuel cycle to reduce the potential for diversion or proliferation of nuclear materials.

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The idea of multilaterizing the nuclear fuel cycle is not new. It was proposed in the Baruch and Gromyko Plans in the early days of the nuclear age (1946), and never really faded away. It aims to denationalize sensitive fuel-cycle activities and place them in the hands of a group of nations or international organizations instead of individual states. The goal is to reconcile realities (meet states' energy security concerns by giving them a stake in the multilateralized supply system) with ambitions (meet nonproliferation concerns by limiting the number of sensitive facilities in the world, thereby limiting the risks of breakout, diversion, or theft). The multilateralization of the nuclear fuel cycle also automatically reduces the number of required inspections (and their associated costs). Moreover, it promises to act as a powerful confidence-building measure among states and permit significant economies of scale for facilities of high capital costs.

Recent discussions about the multilateralization of the nuclear fuel cycle came to the forefront of the nuclear nonproliferation agenda with the publication of IAEA Director General Mohamed ElBaradei's *The Economist* article "Towards a Safer World" (2003), which makes a case for the placement of all enrichment and reprocessing facilities under multinational control and considers similar approaches to the management and disposal of spent fuel and radioactive waste.

In mid-2004, ElBaradei established an international expert group, which issued a report outlining a set of multilateral nuclear approaches (MNAs) in February 2005. Since then, no fewer than 12 proposals have been put forward by governments, the nuclear industry, and international organizations. These proposals have been summarized in a 2007 IAEA report and are only briefly described below:

1) Proposal on a Reserve of Nuclear Fuel (September 2005): At the 49th regular session of the IAEA General Conference, the United States announced that it would commit up to 17 metric tons of HEU to be down-blended to LEU to support assurances of reliable fuel supplies for states that abandon enrichment and reprocessing.

2) Global Nuclear Power Infrastructure (January 2006): Russia proposed to create a global infrastructure (GNPI) which will give all interested states equal access to nuclear energy as long as they are in good nonproliferation standing. This infrastructure would include the creation of a system of international centres providing nuclear fuel cycle services, including enrichment, on a non-discriminatory basis and under the control of the IAEA.

3) Global Nuclear Energy Partnership (February 2006): Under GNEP, a consortium of nations with advanced nuclear technologies, led by the United States, would ensure that countries who agree to abandon their investments in enrichment and reprocessing technologies would have reliable access to nuclear fuel.

4) World Nuclear Association Proposal (May 2006): The WNA proposed a three-level mechanism to assure uranium enrichment services, involving basic supply security provided by the existing world market, collective guarantees by enrichment

companies supported by governmental and IAEA commitments, and government stocks of enriched uranium product.

5) Concept for a Multilateral Mechanism for Reliable Access to Nuclear Fuel (June 2006): A group of enrichment service supplier states (the United States, the United Kingdom, Russia, Germany, France, and the Netherlands) proposed two levels of enrichment assurance beyond the regular market. Suppliers would agree to substitute for each other in case of supply interruptions to states in good nonproliferation standing. If that fails, LEU reserves would be made available to palliate the issue.

6) IAEA Standby Arrangements System (September 2006): Described as complementary to the previous proposal, Japan proposed an information system, to be managed by the IAEA, which would disseminate information contributed voluntarily by IAEA member states on their national capacities for uranium ore, reserves, conversion, enrichment, and fuel fabrication.

7) IAEA Nuclear Fuel Bank (September 2006): The Nuclear Threat Initiative offered to help the IAEA create an LEU stockpile which could be be made available in case of disruption of other supply arrangements.

8) Enrichment Bonds Proposal (September 2006): Recently renamed the Nuclear Fuel Assurance, the United Kingdom proposed a bonding principle which would (should nonproliferation obligations be met) guarantee that national enrichment providers would not be prevented from supplying enrichment services, and provide prior consent for export assurances.

9) International Uranium Enrichment Centre (January and May 2007): As an element in the creation of GNPI, Russia proposed the establisment of an IUEC at Angarsk Electrolysis Chemical Complex to provide participating states guaranteed access to uranium enrichment capabilities. A mechanism is also being developed to put aside an LEU stockpile to contribute to a broader assurance of supply mechanism and a regulatory basis for export control will be developed.

10) Multilateral Enrichment Sanctuary Project (May 2007): Germany proposed the creation of a multilteral uranium centre with extra-territorial status, operating under IAEA control on a commercial basis as a new supplier in the market. Users could obtain nuclear fuel for peaceful purposes under strict supervision.

11) Multilateralization of the Nuclear Fuel Cycle (May 2007): Austria proposed a two-track multilateral mechanism in which the first track would optimize transparency beyond IAEA safeguards and the second track would place all nuclear fuel transactions under the auspices of a Nuclear Fuel Bank and enable equal access to and control of most sensitive nuclear technologies.

12) Nuclear Fuel Cycle non-paper (June 2007): Noting that flexibility is necessary to consider an approach to fuel supply options, the European Union proposed criteria for

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assessment of a multilateral mechanism for reliability of fuel supply (proliferation resistance, assurance of supply, consistency with equal rights and obligations, market neutrality

Although these proposals differ in vision, scope, targets, and time required for their implementation, analysts have pointed out that most of them focus on the front-end of the nuclear fuel cycle, i.e. the supply of nuclear fuel. Exceptions are the Russian proposal for a Global Nuclear Power Infrastructure (GNPI), the U.S. proposal for a Global Nuclear Energy Partnership (GNEP), and the Austrian proposal for a two-track multilateral mechanism, which are far-reaching visions addressing services ranging from enrichment and fuel supply to spent fuel take-back and reprocessing.

Analysts have noted that the least ambitious proposals present the advantages of being able to begin their operations rapidly. However, they offer few incentives for customer countries and may appear as hidden strategies by current suppliers to maintain their monopolistic commercial positions. More ambitious proposals offer more incentives to customer states because they are truly multilateral. But also they require the development of large physical infrastructures and the resolution of complex political, legal, and financial issues, which is very time-consuming.

An initiative undertaken by CSCAP in collaboration with several nuclear agencies in the countries of the Asia-Pacific region has involved the creation of a program to increase the transparency of the civilian nuclear facilities in the region. Efforts of the group range from information gathering and dissemination on one end of the spectrum to defining and promoting an international Asian or Pacific Atomic Energy Community (PACATOM) at the other. Specific programs have been established that provide monitoring of various nuclear power facilities in the region and ideas of how to improve the transparency in the back end of the nuclear fuel cycle and technologies that can be used to enhance the transparency and safety in other parts of the cycle.

The website for the CSCAP nuclear transparency project in Asia can be found at the following website: http://www.cscap.nuctrans.org.

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Chapter 10
CSCAP Action Plan

This action plan is meant to provide an initial work program that will enable the practical implementation of the guiding principles outlined in this handbook. Recognizing that some of the action steps outlined will take longer to implement than others, we have made an initial attempt to provide a general sequence by identifying some measures for immediate action and others for a longer time frame. The plan is not exhaustive and will have to be modified in the course of its implementation.

Multilateral organizations and individual states in East Asia must act with resolve to prevent, deter, halt, and eliminate the proliferation of WMD and their delivery systems. While the existing international treaties and regimes described in this handbook have slowed the spread of WMD, a number of states and nonstate organizations continue to pursue development of these weapons.

The acquisition of WMD by additional states in conjunction with the spread of dual-use technology and knowledge increases the risk of such weapons being used by states or falling into the hands of nonstate actors. This poses a direct and indirect threat to the interests of States and multilateral organizations in the region.

An effective response requires forceful, coordinated action by both states and regional organizations in the Asia-Pacific region coupled with a strengthening of the global nonproliferation regime. These strategic elements of the response include:

- Reduce demand through mechanisms such as security assurances, arms control, regional security cooperation, penalties for violating the established global nonproliferation regime, and reducing the utility of stockpiling WMD.

- Control supply of source material by limiting the production of fissile material, establishing and maintaining effective trade management systems for strategic goods, protecting existing stockpiles of weapons and source materials, and safeguards for facilities that produce source materials.

- Reduce the threat of military confrontation or accidental loss from existing stockpiles and production facilities through the use of verification regimes, transparency measures, detection systems, and accident response plans.

- Safe and secure disposal of existing weapons stockpiles and waste materials through arms reduction agreements, verification measures, waste management systems, and programs for environmental cleanup.

In addition to preventive cooperative measures, coercive measures under Chapter 7 of UN Charter and international law such as sanctions, interceptions of shipments, and the use of force may also be needed as part of an effective response.

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Format for action plan entries:

Action item: (brief description of the action being proposed)

Purpose: (aspect of proliferation being addressed – reduce demand, control of supply, verification/transparency, incident response, safe and secure disposal)

Level of implementation: (global, regional, national)

Required instrument: (national legislation, international treaty, political agreement, enforcement mechanism, voluntary cooperation)

Expected timeframe: (immediate, short, medium, long)

Costs: (financial, political)

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Appendix 1
Glossary of Terms

A

Actinide: An element with atomic number of 89 (actinium) to 102. Usually applied to those above uranium - 93 up (also called transuranics). Actinides are radioactive and typically have long half-lives. They are therefore significant in wastes arising from nuclear fission, e.g. used fuel. They are fissionable in a fast reactor.

Alpha particle: A positively-charged particle from the nucleus of an atom, emitted during radioactive decay. Alpha particles are helium nuclei, with 2 protons and 2 neutrons.

Atom: A particle of matter which cannot be broken up by chemical means. Atoms have a nucleus consisting of positively-charged protons and uncharged neutrons of the same mass. The positive charges on the protons are balanced by a number of negatively-charged electrons in motion around the nucleus.

Atomic bomb: A weapon that uses fissile material in isotopes of uranium or plutonium to provide explosive power.

B

Background radiation: The naturally-occurring ionising radiation which every person is exposed to, arising from the earth's crust (including radon) and from cosmic radiation.

Ballistic missile: A missile that travels to its target without power or guidance after being launched and at a velocity such that it will follow a flight trajectory to a desired point. Part of the flight of longer-range ballistic missiles may occur outside the Earth's atmosphere, and involve the "reentry" of the missile before it reaches its target.

Beta particle: A particle emitted from an atom during radioactive decay. Beta particles may be either electrons (with negative charge) or positrons.

Biological shield: A mass of absorbing material (eg thick concrete walls) placed around a reactor or radioactive material to reduce the radiation (especially neutrons and gamma rays respectively) to a level safe for humans.

Biological weapon (BW): A device that projects, disperses, or disseminates living microorganisms, biological agents, and toxins.

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Boiling water reactor (BWR): A common type of light water reactor (LWR) where water is allowed to boil in the core thus generating steam directly in the reactor vessel.

C

CANDU: Canadian deuterium uranium reactor, moderated and (usually) cooled by heavy water.

Chain reaction: A reaction that stimulates its own repetition, in particular where the neutrons originating from nuclear fission cause an ongoing series of fission reactions.

Chemical weapon (CW): Gaseous, liquid, or solid chemical substances with toxic properties that are delivered using munitions and dispersal devices to cause death or severe harm to humans, animals, and plants. CW include blister, nerve, choking, and blood agents.

Cladding: The metal tubes containing oxide fuel pellets in a reactor core.

Compliance provisions: Enforcement provisions included in a treaty or legally binding agreement to ensure that parties abide by the requirements or restrictions set out in the treaty. Compliance provisions include inspection measures to confront state parties suspected of treaty violations and lists of sanctions that can be imposed on any state party that has violated its obligations.

Conference on Disarmament (CD): Group of states formed in 1979 following the first Special Session on Disarmament of the UN General Assembly held in 1978. As of August 2008, the CD had 65 member states, with a further 36 having observer status. Although the CD concerns itself with practically all issues involving multilateral arms control, it currently focuses its attention on issues related to nuclear disarmament and nonproliferation.

Control rods: Devices to absorb neutrons so that the chain reaction in a reactor core may be slowed or stopped by inserting them further, or accelerated by withdrawing them.

Core: The central part of a nuclear reactor containing the fuel elements and any moderator.

Counterproliferation: Military efforts to combat proliferation, including the application of military power to protect forces and interests, intelligence collection, and analysis.

Critical mass: The smallest mass of fissile material that will support a self-sustaining chain reaction under specified conditions.

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Criticality: Condition of being able to sustain a nuclear chain reaction.

D

De-activate: To remove a weapon from operational status for an indefinite period. Used synonymously with de-alert in referring to nuclear missiles.

De-alert: To reduce the level of readiness to launch of nuclear weapons systems. Measures include removing nuclear warheads from missiles and storing the warheads separately from the missiles.

Decay: Disintegration of atomic nuclei resulting in the emission of alpha or beta particles (usually with gamma radiation). Also the exponential decrease in radioactivity of a material as nuclear disintegrations take place and more stable nuclei are formed.

Decommissioning: Removal of a facility (eg reactor) from service, also the subsequent actions of safe storage, dismantling and making the site available for unrestricted use.

Delayed neutrons: Neutrons released by fission products up to several seconds after fission. These enable control of the fission in a nuclear reactor.

Depleted uranium: Uranium having less than the natural 0.7% U-235. As a by-product of enrichment in the fuel cycle it generally has 0.25-0.30% U-235, the rest being U-238. Can be blended with highly-enriched uranium (eg from weapons) to make reactor fuel.

Deuterium: "Heavy hydrogen," a stable isotope having one proton and one neutron in the nucleus. It occurs in nature as 1 atom to 6500 atoms of normal hydrogen, (Hydrogen atoms contain one proton and no neutrons).

Dual-use item: An item that has both civilian and military applications.

E

Entry into force: The moment at which all provisions of a treaty are legally binding on its parties. Every treaty specifies preconditions for its entry into force.

Enriched uranium: Uranium in which the proportion of U-235 (to U-238) has been increased above the natural 0.7%. Reactor-grade uranium is usually enriched to about 3.5% U-235, weapons-grade uranium is more than 90% U-235.

Enrichment: Physical process of increasing the proportion of U-235 to U-238.

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European Atomic Energy Community (EURATOM): Launched in 1958 to facilitate the development of nuclear energy for peaceful purposes within the European Community.

F

Fast breeder reactor (FBR): A fast neutron reactor (qv) configured to produce more fissile material than it consumes, using fertile material such as depleted uranium in a blanket around the core.

Fast neutron: neutron released during fission, travelling at very high velocity (20,000 km/s) and having high energy (c 2 MeV).

Fast neutron reactor: A reactor with no moderator and hence utilizing fast neutrons. It normally burns plutonium while producing fissile isotopes in fertile material such as depleted uranium (or thorium).

Fertile (of an isotope): Capable of becoming fissile, by capturing neutrons, possibly followed by radioactive decay; eg U-238, Pu-240.

Fissile (of an isotope): Capable of capturing a slow (thermal) neutron and undergoing nuclear fission, e.g. U-235, U-233, Pu-239.

Fission: The splitting of a heavy nucleus into two, accompanied by the release of a relatively large amount of energy and usually one or more neutrons. It may be spontaneous but usually is due to a nucleus absorbing a neutron and thus becoming unstable.

Fissionable (of an isotope): Capable of undergoing fission: If fissile, by slow neutrons; otherwise, by fast neutrons.

Fission products: Daughter nuclei resulting either from the fission of heavy elements such as uranium, or the radioactive decay of those primary daughters. Usually highly radioactive.

Fossil fuel: A fuel based on carbon presumed to be originally from living matter, eg coal, oil, gas. Burned with oxygen to yield energy.

Fuel assembly: Structured collection of fuel rods or elements, the unit of fuel in a reactor.

Fuel fabrication: Making reactor fuel assemblies, usually from sintered UO_2 pellets which are inserted into zircalloy tubes, comprising the fuel rods or elements.

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G

Gamma rays: High energy electro-magnetic radiation from the atomic nucleus, virtually identical to X-rays.

Giga: One billion units (eg gigawatt = 10^9 watts or million kW).

Graphite: Crystalline carbon used in very pure form as a moderator, principally in gas-cooled reactors, but also in Soviet-designed RBMK reactors.

H

Half-life: The period required for half of the atoms of a particular radioactive isotope to decay and become an isotope of another element.

Heavy water: Water containing an elevated concentration of molecules with deuterium ("heavy hydrogen") atoms.

Heavy water reactor (HWR): A reactor which uses heavy water as its moderator, eg Canadian CANDU (pressurised HWR or PHWR).

High-level wastes: Extremely radioactive fission products and transuranic elements (usually other than plutonium) in used nuclear fuel. They may be separated by reprocessing the used fuel, or the spent fuel containing them may be regarded as high-level waste.

Highly (or High)-enriched uranium (HEU): Uranium enriched to at least 20% U-235. (That in weapons is about 90% U-235.)

Hydrogen bomb: A weapon that uses nuclear fusion to provide explosive power. Also referred to as a thermonuclear bomb.

I

Information Circular 26 (INFCIRC/26): The first IAEA safeguards system applicable to reactors rated less than 100 thermal megawatts, approved by the IAEA Board of Governors on January 31, 1961. It was revised in June 1963 to cover reactors of any size.

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Information Circular 66 (INFCIRC/66): The model safeguards agreement approved by the IAEA in February 1965 to safeguard individual nuclear facilities. The guidelines were later revised to include reprocessing and fuel fabrication plants.

Information Circular 153 (INFCIRC/153): An IAEA document entitled "The Structure and Content of Agreements Between the Agency and States Required in Connection with the NPT." Established by the IAEA in April 1970 after the NPT entered into force. The document created the full scope safeguards system whereby any non-nuclear weapon state party to the NPT agrees to establish and maintain a system of accounting and control of all nuclear material under its jurisdiction.

Information Circular 540 (INFCIRC/540): A document approved by the IAEA in May 1997, called the "Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards," which supplements the INFCIRC/153. The Model Protocol grants IAEA inspectors additional physical access to sites of IAEA member states where nuclear material is or could be present, expands the use of unannounced inspections, and allows for collection of environmental samples.

Ion: An atom that is electrically-charged because of loss or gain of electrons.

Ionizing radiation: Radiation (including alpha particles) capable of breaking chemical bonds, thus causing ionization of the matter through which it passes and damage to living tissue.

Irradiate: Subject material to ionizing radiation. Irradiated reactor fuel and components have been subject to neutron irradiation and hence become radioactive themselves.

Isotope: An atomic form of an element having a particular number of neutrons. Different isotopes of an element have the same number of protons but different numbers of neutrons and hence different atomic mass, eg. U-235, U-238. Some isotopes are unstable and decay (qv) to form isotopes of other elements.

L

Light water: Ordinary water (H_20) as distinct from heavy water.

Light water reactor (LWR): A common nuclear reactor cooled and usually moderated by ordinary water.

Low-enriched uranium: Uranium enriched to less than 20% U-235. (That in power reactors is usually 3.5 - 5.0% U-235.)

Low-level wastes: Mildly radioactive material usually disposed of by incineration and burial.

M

Megawatt (MW): A unit of power, = 10^6 watts. **MWe** refers to electric output from a generator, **MWt** to thermal output from a reactor or heat source (eg the gross heat output of a reactor itself, typically three times the MWe figure).

Metal fuels: Natural uranium metal as used in a gas-cooled reactor.

Micro: one millionth of a unit (eg microsievert is 10^{-6} Sv).

Milling: Process by which minerals are extracted from ore, usually at the mine site.

Mixed oxide fuel (MOX): Reactor fuel which consists of both uranium and plutonium oxides, usually about 5% Pu, which is the main fissile component.

Moderator: A material such as light or heavy water or graphite used in a reactor to slow down fast neutrons by collision with lighter nuclei so as to expedite further fission.

Multilateral: Negotiations, agreements or treaties that effect or are between three or more parties, countries, etc.

N

National technical means (NTMs): Satellites, aircraft, and electronic and seismic monitoring devices used to survey the activities of other states, including military movements and treaty compliance. NTMs are used to verify arms control treaties.

Natural uranium: Uranium with an isotopic composition as found in nature, containing 99.3% U-238, 0.7% U-235 and a trace of U-234. Can be used as fuel in heavy water-moderated reactors.

Negative security assurances: A pledge by a nuclear weapon state that it will not use nuclear weapons against a non-nuclear weapon state. Some states have policies that allow for the use of nuclear weapons if attacked with other WMD by a non-nuclear weapon state. [See positive security assurances below]

Neutron: An uncharged elementary particle found in the nucleus of every atom except hydrogen. Solitary mobile neutrons travelling at various speeds originate from fission

reactions. Slow (thermal) neutrons can in turn readily cause fission in nuclei of “fissile” isotopes, e.g. U-235, Pu-239, U-233; and fast neutrons can cause fission in nuclei of "fertile" isotopes such as U-238, Pu-239. Sometimes atomic nuclei simply capture neutrons.

New Agenda Coalition (NAC): In June 1998, the foreign ministers from Brazil, Egypt, Ireland, Mexico, New Zealand, Slovenia, South Africa, and Sweden issued a statement calling for a new nuclear disarmament agenda. (Slovenia later withdrew from the NAC.) The NAC calls for the five nuclear weapons states and the three nuclear-capable states to make an unequivocal commitment to nuclear disarmament and to begin multilateral negotiations that would lead to the elimination of nuclear weapons through a Nuclear Weapons Convention.

Non-nuclear weapon state (NNWS): Under the NPT, states that had not detonated a nuclear device prior to January 1, 1967 (that is, all states other than the United States, Russia, the United Kingdom, France, and China).

Nuclear energy: The energy derived from nuclear reactions. Two types of nuclear energy are especially relevant, nuclear fission – when the nucleus of an atom is split into two lighter nuclei, and nuclear fusion – when two nuclei are joined together.

Nuclear fuel cycle: The process of mining and refining uranium for use as reactor fuel.

Nuclear reactor: A device in which a nuclear fission chain reaction occurs under controlled conditions so that the heat yield can be harnessed or the neutron beams utilized. All commercial reactors are thermal reactors, using a moderator to slow down the neutrons.

Nuclear weapon states (NWS): As defined by Article IX, paragraph 3 of the NPT, the five states that detonated a nuclear device prior to January 1, 1967 (China, France, the Soviet Union, the United Kingdom, and the United States).

Nuclear-Weapon-Free Zone (NWFZ): A geographical area in which nuclear weapons are not allowed to be built, possessed, transferred, deployed, or tested.

Nuclide: elemental matter made up of atoms with identical nuclei, therefore with the same atomic number and the same mass number (equal to the sum of the number of protons and neutrons).

O

Oxide fuels: Enriched or natural uranium in the form of the oxide UO_2, used in many types of reactor.

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P

Plutonium: A transuranic element, formed in a nuclear reactor by neutron capture. It has several isotopes, some of which are fissile and some of which undergo spontaneous fission, releasing neutrons. Weapons-grade plutonium is produced in special reactors to give >90% Pu-239, reactor-grade plutonium contains about 30% non-fissile isotopes. About one third of the energy in a light water reactor comes from the fission of Pu-239, and this is the main isotope of value recovered from reprocessing used fuel.

Plutonium Reprocessing: The process of separating plutonium from irradiated uranium. Can be used to create components for nuclear weapons from spent reactor fuel.

Pressurized water reactor (PWR): The most common type of light water reactor (LWR), it uses water at very high pressure in a primary circuit and steam is formed in a secondary circuit.

Positive security assurances: Guarantees by nuclear weapon states that they will assist any non-nuclear weapon state that is the target of nuclear aggression or is threatened by such aggression.

Precursor chemical: A chemical that can be chemically combined with another substance to form a chemical warfare agent. Most precursors controlled through nonproliferation initiatives also have commercial uses.

Proliferation (of WMD): The spread of WMD. Horizontal proliferation refers to the spread of WMD to states that have not previously possessed them. Vertical proliferation refers to an increase in the amount or devastating capacity of any currently existing WMD arsenals within a state.

R

Radiation: The emission and propagation of energy by means of electromagnetic waves or particles.

Radioactivity: The spontaneous decay of an unstable atomic nucleus, giving rise to the emission of radiation.

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Radiological weapons: Devices that release radiation with the intent of inflicting severe injury or financial and psychological costs. The radiological isotopes used to produce radiological dispersal devices are found in waste from medical facilities, industrial plants, and nuclear power plants.

Radionuclide: A radioactive isotope of an element.

Radiotoxicity: The adverse health effect of a radionuclide due to its radioactivity.

Radium: A radioactive decay product of uranium often found in uranium ore. It has several radioactive isotopes. Radium-226 decays to radon-222.

Radon (Rn): A heavy radioactive gas given off by rocks containing radium (or thorium). Rn-222 is the main isotope.

Radon daughters: Short-lived decay products of radon-222 (Po-218, Pb-214, Bi-214, Po-214).

Ratification: The implementation of the formal process established by a country to legally bind its government to a treaty, such as approval by parliament. In the United States, treaty ratifications require approval by the president after he has received the advice and consent of two-thirds of the Senate. The country then submits the required legal instrument of ratification to the treaty's depositary governments.

Reactor pressure vessel: The main steel vessel containing the reactor fuel, moderator and coolant under pressure.

Reprocessing: Chemical treatment of used reactor fuel to separate uranium and plutonium and possibly transuranic elements from the small quantity of fission product wastes, leaving a much reduced quantity of high-level waste (which today includes the transuarnic elements).

S

Safeguards: Monitoring of nuclear material to ensure it is not used for military purposes, as implemented by the IAEA.

Sarin: A nerve agent used in chemical weapons. Sarin is a highly toxic organophosphate compound, similar to an insecticide, first developed by German scientists in the 1930s. Like other agents in this category, it binds with the body's enzymes and causes chemical imbalances within the body's nervous system.

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Signature: The signing of a treaty by a senior representative of a country, which indicates that the country accepts the treaty and commits, until the country completes its ratification process, not to take any actions that would undermine its purposes, according to the Vienna Convention on the Law of Treaties.

Spent fuel: Used fuel assemblies removed from a reactor after several years use and treated as waste.

T

Thermal reactor: A reactor in which the fission chain reaction is sustained primarily by slow neutrons, and hence requiring a moderator.

Toxin: A poison formed as a specific secretion product in the metabolism of a vegetable or animal organism as distinguished from inorganic poisons. Such poisons can also be manufactured by synthetic processes.

Transmutation: Changing atoms of one element into those of another by neutron bombardment, causing neutron capture and/or fission. In an ordinary reactor neutron capture is the main event, in a fast reactor fission is more common and therefore it is best for dealing with actinides. Fission product transmutation is by neutron capture.

Transuranic element: A very heavy element formed artificially by neutron capture and possibly subsequent beta decay(s). Has a higher atomic number than uranium (92). All are radioactive. Neptunium, plutonium, americium and curium are the best-known.

U

Uranium (U): A mildly radioactive element with two isotopes which are fissile (U-235 and U-233) and two which are fertile (U-238 and U-234). Uranium is the basic fuel of nuclear energy.

Uranium hexafluoride (UF_6): A compound of uranium which is a gas above 56°C and is thus a suitable form in which to enrich the uranium.

Uranium oxide concentrate (U_3O_8): The mixture of uranium oxides produced after milling uranium ore from a mine. Sometimes loosely called yellowcake. It is khaki in colour and is usually represented by the empirical formula U_3O_8. Uranium is sold in this form.

DRAFT

V

Verification: The process of using mechanisms such as satellites, seismic monitoring, or on-site inspections, to collect data that demonstrates a party's compliance with an agreement or treaty.

Vitrification: The incorporation of high-level wastes into borosilicate glass, to make up about 14% of it by mass. It is designed to immobilize radionuclides in an insoluble matrix ready for disposal.

W

Waste:

High-level waste (HLW) is highly radioactive material arising from nuclear fission. It can be what is left over from reprocessing used fuel, though some countries regard spent fuel itself as HLW. It requires very careful handling, storage and disposal.

Low-level waste (LLW) is mildly radioactive material usually disposed of by incineration and burial.

Weapons-grade: Refers to nuclear material that is most suitable for the manufacture of nuclear weapons- e.g., uranium (U) enriched to 93 percent U-235 or plutonium (Pu) that is over 90 percent Pu-239. Crude weapons can be fabricated from lower-grade material.

Weapons of mass destruction (WMD): In official U.S. documents, WMDs are most frequently described as nuclear, biological or chemical weapons. Some experts also define radiological weapons as a type of weapon of mass destruction.

Y

Yellowcake: Ammonium diuranate, the penultimate uranium compound in U_3O_8 production, but the form in which mine product was sold until about 1970. See also Uranium oxide concentrate.

Z

Zircaloy: Zirconium alloy used as a tube to contain uranium oxide fuel pellets in a reactor fuel assembly.

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Appendix 2
List of Abbreviations

ABM – Anti-ballistic Missiles

ANL – Argonne National Laboratory (U.S.)

ASTOP – Asian Senior-Level Talks on Non-Proliferation

BCR – Bio-Chem Redirection Program (U.S.)

BEP – Biosecurity Engagement Program (U.S.)

BNG PS – British Nuclear Group Project Services

BOG – Board of Governors (IAEA)

BTWC – Biological and Toxin Weapons Convention (1972; also known as BWC)

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CD – Conference on Disarmament (UN)

CNS – Convention on Nuclear Safety

CPPNM – Convention on the Physical Protection of Nuclear Material

CSA – Comprehensive Safeguards Agreement (IAEA)

CSCAP – Council for Security Cooperation in Asia-Pacific

CSI – Container Security Initiative

CTBT – Comprehensive Nuclear Test Ban Treaty

CTR – Cooperative Threat Reduction

CWC – Chemical Weapons Convention

DHS – U.S. Department of Homeland Security

DNDO – U.S. Domestic Nuclear Detection Office

DRAFT

DOD – U.S. Department of Defense

DOE – U.S. Department of Energy

EWGPP – Elimination of Weapons-Grade Plutonium Production (US)

EXBS – Export Control and Related Border Security Program (US)

EU – European Union

FAO – Food and Agriculture Organization

FASI – Russian Federal Agency for Scientific Innovation

FMCT – Fissile Material Cut-Off Treaty

FMSF – Fissile Material Storage Facility (US)

FR – Fast Reactor

GAO – U.S. General Accounting Office

GNEP – Global Nuclear Energy Partnership

GNMTRP – Global Nuclear Material Threat Reduction Program

GSEC – Global Security Engagement and Cooperation

GRTRP – Global Radiological Threat Reduction Program

GTRI – Global Threat Reduction Initiative (US)

HCOC – Hague Code of Conduct Against Ballistic Missile Proliferation

HEU – Highly enriched uranium

IAEA – International Atomic Energy Agency

IBRAE – Nuclear Safety Institute (Russia)

ICMS – Information and Collaboration and Management System (EU BTWC implementation assistance program)

IND – Improvised Nuclear Device

DRAFT

INF – Treaty on Intermediate-Range Nuclear Forces

INFCC – International Fuel Cycle Centers

INPRO – International Project on Innovative Reactors and Fuel Cycles

INSEP – International Nuclear Safeguards and Engagement Program (US)

IPFM – International Panel on Fissile Materials

IPPE – Institute of Physics and Power Engineering (Russia)

ISTC – International Science and Technology Center

ISU – Implementation Support Unit (BTWC)

ITDB – Illicit Trafficking Database

ITWG – Nuclear Smuggling International Technical Working Group

IUEC – International Uranium Enrichment Center (Russia)

JCC – Joint Coordinating Committee

JCG – Joint Coordinating Group

KIMACS – Kurchatov Institute Materials Accounting and Control System (Russia)

KINAC – Korea Institute for Nuclear Nonproliferation and Control

KINS – Korea Institute for Nuclear Safety

LLNL – Lawrence Livermore National Laboratory (US)

LMC – Liquid-Metal Coolant Reactors

LSF – Long-term Radioactive Waste Storage Facility

LWR – Light Water Reactors

MA – Minor Actinides

MOM – Material Operation Monitoring System

MOX – Mixed Oxide Fuel

DRAFT

MPC&A – Material, Protection, Control, and Accounting

MTCR – Missile Technology Control Regime

NAM – Non-Aligned Movement

NFC – Nuclear Fuel Cycle

NNSA – U.S. National Nuclear Security Agency

NNWS – Non-nuclear weapon states

NPT – Nuclear Non-Proliferation Treaty

NTI – Nuclear Threat Initiative (US)

NTC – International Convention for the Suppression of Acts of Nuclear Terrorism (Nuclear Terrorism Convention)

NWC – Nuclear Weapons Convention

NWS – Nuclear weapon states

OIE – World Organization for Animal Health

OPCW – Organization for the Prohibition of Chemical Weapons

ORNL – Oak Ridge National Laboratory (US)

PIC – Pacific Island Country

PIF – Pacific Islands Forum

PMBOK – Project Management Body of Knowledge

PMDA – U.S.-Russian Agreement Concerning the Management and Disposition of Plutonium Designated as No Longer Required for Defense Purposes and Related Cooperation

PrepCom – Preparatory Committee (to the BTWC, CWC, NPT, CTBT or other treaties)

PSI – Proliferation Security Initiative

RANF – Reliable Access to Nuclear Fuel

DRAFT

RAS – Russian Academy of Sciences

RC – Reactor Compartment

RERTR – Reduced Enrichment for Research and Test Reactors Program

RevCon – Review Conference (of the BTWC, CWC or NPT or other treaties)

RR – Reactor Rooms

RU – Reactor Units

RW – Radiological Waste

SNF – Spent Nuclear Fuel

SORT – Strategic Offensive Reduction Treaty

SQP – Small Quantities Protocol (IAEA)

SRNL – Savannah River National Laboratory (US)

START I – Strategic Arms Reduction Treaty

START II – Strategic Arms Reduction Treaty

TR – Thorium Reactor

TSF – Temporary Storage Facility

UNSCR 1540 – United Nations Security Council Resolution 1540

VLLW – Very Low Level Waste

WMD – Weapons of Mass Destruction

WNA – World Nuclear Association