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Despite the fact that the actual use of Nuclear, Biological and Chemical (NBC) Weapons has reduced since the World War II, few states remain on the threshold of acquiring them for strategic purpose. While on one hand states like India have done well on proliferation control regimes, the danger of spread of NBC weapons in regions like Africa remains since the weaker countries generally remain vulnerable to NBC usage by state and non state actors. Therefore, strengthening of the protocols on safety and technology on NBC transfers and usage remains the only viable option.

In the current issue of the magazine, Ruchita Beri argues that despite efforts, sub-Saharan African region has shown mixed performance on control regimes and more needs to be done in that respect. Animesh Raul takes a historical perspective on the state policies on biological warfare. He argues that the likelihood of biological warfare has reduced as instances and intensity of its use have reduced over the period of time. Rajiv Nayan makes a case for India's robust performance on the biological export controls system.

This issue includes other regular features like Country Profile, Kaleidoscope, Chemical and Biological News and Book Review.

With our readers' feedback, we wish to publish issues in the future that focus on a subject of particular concern. We would like to inform our readers that the CBW Magazine is now a bi-annual publication and this issue is the first issue in the new format.

Contributions and feedback are welcome and can be addressed to:
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NBC Weapons: How free is Africa of the scourge?

Ms. Ruchita Beri

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Summary

The entry into force of the Africa's Nuclear Weapon Free Zone Treaty or the Treaty of Pelindaba in July 2009 and the first conference of parties on November 4, 2010 is a big step towards making the African continent free of the scourge of nuclear weapons. The Treaty of Pelindaba seeks to ensure that nuclear weapons are not developed, produced, tested or otherwise acquired or stationed anywhere on the African continent or its associated islands. At the same time the treaty provides for the promotion of cooperation in the peaceful uses of nuclear energy on the African continent. Though Sub Saharan Africa is free of nuclear weapons programmes, many African countries have peaceful nuclear facilities and radioactive sources.

The entry into force of the Africa's Nuclear Weapon Free Zone Treaty or the Treaty of Pelindaba in July 2009 and the first conference of parties on November 4, 2010 is a big step towards making the African continent free of the scourge of nuclear weapons. The Treaty of Pelindaba aims "to ensure that nuclear weapons are not developed, produced, tested or otherwise acquired or stationed anywhere on the African continent or its associated islands"¹. At the same time the treaty provides for the promotion of cooperation in the peaceful uses of nuclear energy on the African continent. Though Sub Saharan Africa is free of nuclear weapons programmes, many African countries have peaceful nuclear facilities and radioactive sources. Furthermore, there are serious concerns about the adequate protection and management of materials that are present and utilised in the commercial and biological industries and research laboratories in the region. In particular South Africa maintains an extensive animal vaccine production and pharmaceutical industry, according to the UNSC Resolution 1540 Database. It also has a "very advanced chemical and microbiological research and development capacity".²

NBC Status

At present if one follows the IAEA records, four Sub Saharan countries have nuclear facilities- Democratic Republic of Congo (DRC), Ghana, Nigeria and South Africa.³ The DRC has Triga II research reactor at the University of Kinshasa. Ghana obtained a slowpoke type reactor from China with the assistance of IAEA according to the UNSC Resolution 1540 Database. Nigeria has a tank in pool type Miniature Source Reactor (NIRR-1) that uses 90 percent enriched Uranium as fuel. It also has plans to purchase a slow poke type type reactor from China through the IAEA.⁴ Of the countries in the

region South Africa has the most advanced nuclear programme on the continent with two power reactors and a tank in pool research reactor.⁵ South Africa aims for the expansion of nuclear energy production from 6 percent to 30 percent by 2020. A number of sub Saharan countries also possess uranium reserves. According to the UNSC Resolution 1540 Database, the major producers are South Africa, Namibia, Niger and Gabon. Others like Republic of Congo, Central African Republic, Guinea, Malawi and Zambia possess minor reserves. Though Sub Saharan countries are free of any nuclear weapons several states have peaceful nuclear programmes and radioactive material sources. Hence protection of these programmes is an issue of concern.

Similarly the African countries have to take care of the protection and management of materials utilised in commercial chemical and biological industries in the region. South Africa and Nigeria are the main African countries involved in such research. Currently dismantled, South Africa had an active chemical and biological warfare programme during Apartheid era called "Project Coast". It was headed by infamous Dr. Wouter Basson, nicknamed "Dr. Death" for his role in killing political dissidents through this programme. South Africa's Truth and Reconciliation Commission investigated Basson's role in the project, however he was later acquitted of all criminal charges, in part, due to a general amnesty.

Adherence to Treaties and Agreements

Sub Saharan African countries' record in terms of adherence to various non proliferation regimes is somewhat mixed. All countries are party to the NPT and majority are party to the Chemical Weapons Convention (CWC). The CWC was signed in 1993 and entered into force in 1997. The

CWC is of unlimited duration and obliges state parties not to develop, produce, acquire, stockpile, transfer, use or prepare to use chemical weapons. Currently 46 states in the region are party to the CWC. With 100 percent destruction of CW in the region the Organisation for the Prohibition of Chemical Weapons (OPCW) is at present involved in Africa primarily on capacity building in areas of peaceful application of chemistry through an exchange programme. On the other hand it was only thirteen years after its existence that the Pelindaba treaty entered into force in 2009. As of now 29 states have ratified the treaty. However some of the blame also lies on the Nuclear Weapon States (NWS). At present of the five NWS it has been ratified only by France, China and UK. The reticence of US and Russia is linked to the atoll Diego Garcia in the Indian Ocean. While UK and US insist that Diego Garcia is not geographically part of Africa, African Union (AU) insists that Diego Garcia is part of Mauritius, which is turn in an AU member and therefore should be included in the treaty.

The Biological and Toxin Weapons Convention (BTWC) opened for signature in 1972 and entered into force in 1975. It prohibits the development, production, acquisition, transfer, retention and stockpiling of biological weapons and toxins.⁶ Thirty African states are party to the BTCW at present. The problem with biological agents is that all materials are dual use goods which mean they are hard to detect. Misuse of biological agents could take a much greater toll on any population by way of increased illnesses, long term disability and/or death. These concerns have grown in recent years with the realization that deadly diseases like Ebola, Marburg, and anthrax are prevalent in Africa. These pathogens can be made into weapons and is a threat that cannot be ignored. Apparently Soviet scientists used pathogens from Africa to make biological

weapons during the Cold War.⁷ With the knowledge that Al-Qaeda and other terrorist groups are active in Africa, it becomes imperative that the deadly pathogens stored in labs in countries such as Uganda and Kenya are secure.

However a cursory survey within Africa shows that national legislations incorporating CWC and BTCW are lacking within most of the countries in the region. According to a recent study, there is no information available on the status of implementation legislation in 15 of the 30 CTCW state parties in Africa.⁸ The remaining 15 state parties: Cape Verde, Democratic Republic of Congo, Equatorial Guinea, Ethiopia, Ghana, Kenya, Libya, Mauritius, Nigeria, Senegal, Seychelles, South Africa, Tunisia and Zimbabwe have some measures or legislation that partly implements the BTCW have been adapted.⁹ Similarly Nigeria recently reiterated that it is committed to the Biological Weapons Convention and has produced draft bills for the national implementation of BWC and CWC.¹⁰ There is no doubt that African countries need to address the deficiencies in the existence and scope of national implementation legislation on priority basis not only to comply with the obligation under BTWC but also avoid the development of biological weapons in the country. With the seventh BTCW Review conference scheduled in 2011, the African countries have no time to waste.

In conclusion, it appears that physical protection and safeguarding of NBC materials must remain top priority within Africa. African countries must work at both national and regional level to assure the adequate protection and management of materials that are present in the region. However it needs to be understood that most African countries have more urgent matters to deal with. Genocide, food security, health issues such as spread of HIV/AIDS, conflict

resolution and other pressing concerns have affected ability and desire to implement national legislation for non proliferation regimes. As a result nuclear biological and chemical weapons non proliferation remains a low priority for Africans.

Endnotes:

- 1 Amelia Broodryk and Noel Stott, Major Boost for Africa's Quest to be Nuclear Weapon Free, available at <http://www.the-african.org/blog/?p=311>
- 2 NTI Data Base, Sub Saharan Africa- 1540 related regional activities at http://www.nti.org/db/1540/region_subsahara.html
- 3 Ibid
- 4 Ibid
- 5 Ibid
- 6 Biological Weapons Convention, UNOG, [http://www.unog.ch/80256EE600585943/\(httpPages\)/04FBBD6315AC720C1257180004B1B2F?OpenDocument](http://www.unog.ch/80256EE600585943/(httpPages)/04FBBD6315AC720C1257180004B1B2F?OpenDocument)
- 7 "US seeks to aid Africa in securing deadly antigens" NTI Global Security News wire, November 4, 2010
- 8 Angela Woodward, "Banning biological weapons, National legislation in Africa" African Security Review vol. 14, no.1, 2005 p.26
- 9 Ibid
- 10 "Nigerian government says committed to Biological Weapons Convention" Xinhua October 7, 2010

Biological Weapons Export Controls in India

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Summary

India's growing biotechnology industry is a subject of discussions all over the world. There are several Indian companies and laboratories which have come up against heavy odds and are known as world class. In the coming years, the Indian biotech industry is going to become very active in the world market. Its top companies are allocating substantial resources in the Research & Development sector.

President Obama, during his India's visit, announced liberalization of American export controls for India. Later, in a joint statement signed with the Indian Prime Minister Shri Manmohan Singh, he endorsed the candidature of India for membership of four multilateral export controls regimes, namely, the Nuclear Suppliers Group (NSG), the Missile Technology Control Regime (MTCR), the Australia Group (AG) and the Wassenaar Arrangement.

Of these, the AG controls chemical and biological agents. This Group was formed in 1985. Initially, it controlled only the chemical agents that could be used for chemical warfare. However, since the early 1990s, the AG also started controlling biological agents. Like other small-group multilateral export control regimes, this informal body provides a set of guidelines and a technology list to its participant countries. The participant countries are supposed to incorporate the guidelines and technology list in their export controls systems.

As the announcement for the Indian candidature has been made in the joint statement during Obama's visit in November 2010, it is evident that India is also willing to become a member of the AG. The joint statement indicates 'the evolution of regime membership criteria, consistent with maintaining the core principles of these regimes' for India. At the same time, it takes commitment from the Indian government to fully adopt 'export control requirements' of a prospective member of these regimes.

India has already adopted guidelines and technological lists of the NSG and the MTCR after the July 18, 2005 India-US joint statement which is better known as the India-US nuclear deal. For the membership of the Australia Group India may have to adopt requirements for a prospective

member.

The Australia Group lays down the following criteria for the membership¹:

- A commitment to prevent the spread of CBW [Chemical and biological Weapons] proliferation, including being a party, in good standing, to the Biological and Toxins Weapons Convention and the Chemical Weapons Convention.
- Being a manufacturer, exporter or transshipper of AG controlled items.
- Adopting and implementing the *AG Guidelines for Transfers of Sensitive Chemical or Biological Items*.
- Implementing an effective export control system which provides national controls for all items on the AG common control lists and is supported by adequate licensing and enforcement regimes.
- Creating legal penalties and sanctions for contravention of controls and being willing to enforce them.
- Creating relevant channels for the exchange of information including: accepting the confidentiality of the information exchange; creating liaison channels for expert discussions; and creating a denial notification system protecting commercial confidentiality.
- Agreeing to participate in the AG in a way that will strengthen the effectiveness of the AG in preventing CBW proliferation.

To take the membership, India may have to send a third party application to the Chair of the group. The Chair will examine India's performance on the criteria requirements. The AG maintains that additional criterion

may be added to the specified criteria for the membership of the group. However, considering the current international mood and dynamics of world politics, it does not seem the AG chair may impose any additional criteria for India's membership since India already fulfills almost all the criteria requirements as discussed below.

India, on a number of occasions, has given statements regarding its commitment to arrest proliferation of WMD. India will definitely participate in AG meetings and proceedings actively. India is known for contributing positively to international organizations and it is campaigning for the permanent membership of the United Nations Security Council.

Additionally, India has implemented all its commitment to WMD nonproliferation through its institutional, legal, and regulatory frameworks. Although the nodal agency for licensing purposes of biological items is Directorate-General of Foreign Trade of the Indian Ministry of Commerce and Industry, there are a number of other departments and agencies of the government of India involved in the export controls process. All the licensing applications for dual-use items go to inter-departmental coordinating agency. The Customs as well as different intelligence and security agencies are enforcing export controls at different entry and exit points quite well.

India has the elaborate legal and regulatory framework. There are different such mechanisms in operation. The prominent are the Indian Environmental (Protection) Act of 1986, Rules for the Manufacture, Use/Import/Export and Storage of Hazardous, Microorganisms/Genetically Engineered Organisms or Cells.1989, Recombinant DNA Guidelines formulated by the Department of Biotechnology in 1990, Guidelines developed in 1999 for generating pre-clinical data for rDNA vaccines, diagnostics and other

biologicals, The Drug Policy of 2002, The Guidelines for research in transgenic plants & guidelines for toxicity and allergenicity evaluation of transgenic seeds, plants and plant parts, National seeds Policy 2002, The Ethical Policies on the Human genome, Genetic Research and Services, Weapons of Mass Destruction and Their Delivery Systems (Prohibition of Unlawful Activities) Act 2005 –WMD Act 2005, and Special Chemicals, Organisms, Materials, Equipment and Technology (SCOMET) List.

The WMD Act has a graded penalty system. In other Indian acts, penalty for different degrees of violation of law has been given in details. In the SCOMET list, category 2 has been allocated for listing biological agents. To meet additional requirements of the Australia Group, the category-2 may have to be elaborated and expanded to include the items of the AG list which is regularly updated. In the same way, the Indian regulatory system may adapt itself for the required “exchange of information including: accepting the confidentiality of the information exchange; creating liaison channels for expert discussions; and creating a denial notification system protecting commercial confidentiality.”

India is a member of both the Conventions—the Biological and Toxins Weapons Convention (BTWC) and the Chemical Weapons Convention (CWC). The CWC has a more detailed arrangement for chemical export controls, but the BTWC, too, has provisions which provide principles for export controls of biological agents with warfare potential. Article III of the BTWC lays down, “Each State party to this Convention undertakes not to transfer to any recipient whatsoever, directly or indirectly, and not in any way to assist, encourage, or induce any State, group of States or international organizations to manufacture or otherwise acquire any of the agents,

toxins, weapons, equipment or means of delivery.”

India’s growing biotechnology industry is a subject of discussions all over the world. There are several Indian companies and laboratories which have come up against heavy odds and are known to be world class. In the coming years, the Indian biotech industry is going to become very active in the world market. Its top companies are allocating substantial resources in the Research & Development sector. A number of countries are showing interest in collaborating with Indian biotechnology industry.

Thus, India, which already has a highly refined biological export controls system, may not have difficulty in meeting the criteria for the membership of the AG. India has already effected attitudinal changes toward the regime which it once criticized as a technology denial regime but strategically insignificant. True, the rising biotechnology profile of the country may help it in taking confidence building measures with global biotechnological commercial actors through the membership of the AG. It is acknowledged in India as in the world that the membership of this regime would not be very problematic for India. The joint statement mentions the phase wise membership of the regimes. Most likely, the membership of the AG would be the first to come.

Endnotes

- ¹ Australia Group Membership Criteria, accessed on 28-12-2010, available at <http://www.australiagroup.net/en/membership.html>

State Actors and Germ Warfare: Historical Perspective

Mr. Animesh Roul

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Summary

The old arguments against the effectiveness of biological warfare still apply. The effects of novel organisms would still be delayed, unpredictable, and difficult to control. In military terms, any advance is almost certainly not a matter of the routine use of biotechnology. Whatever the fact, this double edged weapon still acts like a deterrent against any kind of conventional attack. Empirical evidence suggests that the likelihood of such a war between technologically advanced states is remote as since 1945, the biological weapons have been used only in situations where the victims were unprotected and unable to retaliate.

Two thousand years ago the Greeks and Romans used human and animal corpses with great effect to poison wells of drinking water. The practice of throwing the bodies of plague victims over the walls of cities was also prevalent in the past. This strategy was employed by the Tartars against the Genoese in the Crimea War in 1346. It forced the Genoese to flee immediately and the spread of the disease to Italy became inevitable. Four centuries later infected bodies were used against besieged cities in the Russo-Swedish War of 1710.¹ Another method was employed by the British in their war against the American Indians, known as Pontiac rebellion (1763). Two hostile Indian Chiefs were given two blankets and a handkerchief, infected with the smallpox virus, as gifts.²

No nation has used germs intentionally and successfully against the personnel of another rival nation in the 19th century, though the Germans had injected the horses of Romanian cavalry with 'glanders' in 1914.³ Some allegations were made during World War I that the horses exported from America to Europe had been infected with diseases.⁴ Since then a great deal of research and experiment was devoted by various states to perfecting various techniques of use of living pathogen broadly speaking, biological weapon (BW). Post-war research was largely a continuation of Japanese, German and British policy during the World War II. The Germans, however, did not go beyond the stage of experimentation and sometimes war prisoners (PoWs) were subjected to the tests.⁵ The British had been concerned that the Germans might use biological weapons and consequently launched an intensive research programme. Britain's military was even putting together a bombing plan for the use of anthrax against six German cities: Berlin, Hamburg, Stuttgart, Frankfurt, Aachen, and Wilhelmshaven.⁶

Japanese effort at using bio weapons during 1936 to 1945 was more coherent and effective. It was far more serious and fully substantiated. Large areas in China were used as testing grounds. Sabotage was also examined as a possible means of use of biological weapons. The preparations had reached the stage where a factory for the production of bacterial toxins, vectors and other means for prosecuting biological warfare had been built at Harbin in Manchuria and the programme was carried out in great secrecy.⁷ In 1949, the use of biological warfare was probed during the trial of 12 Japanese prisoners of the Kwantung Army at Khabarovsk, USSR. The details of the trial were published in 1950. It took 27 years to confirm that the Khabarovsk incident was true.⁸ It now appears that, in the course of testing potential biological weapons, the Japanese scientists experimented on more than 3,000 human guinea pigs and they were mostly Chinese and Russian prisoners of war. Hiroshi Akiyama, who claimed to have been a witness, alleged that 1500 to 2000 prisoners had died in these experiments.⁹ The Harbin installation was destroyed by the Japanese before the Russians could capture it.

On 8 May 1951, allegations were made at the United Nations by the North Korean Government and further allegations were made in 1952, together with a statement by Zhou Enlai, then Chinese Foreign Minister, that biological weapon attacks had been made over north-east China. All these allegations were against the US. The charges referred to specific incidents involving insects and plant-pathogens. In 1952, an independent commission, The International Scientific Commission (ISC), was set up and invited to Korea and China to conduct the necessary investigations.¹⁰

The report of ISC mentioned the use of disease agents like plague, pulmonary anthrax, encephalitis and cholera. In the

report the first disease discussed is plague. According to the information, for the past five centuries there had been no plague in Korea. Its appearance was a recent phenomenon. Human fleas infected with plague were alleged to have been found. Another case that the Commission considered took place in Kan Nan. This referred to the use of voles as carriers of plague infected fleas.¹¹ The next case discussed in the report concerns Anthrax which was allegedly spread in Kuan-Tien by anthomyiid fleas and spiders. These were found close to the bombs. Among other cases of anthrax in Liaotung and Liaohsi, a Ptinid beetle was found to be vector, allegedly found in large numbers.¹² Some eye-witnesses were examined by the commission. Several people had contracted respiratory anthrax and were subjected to post-mortem pathological investigation. Another incident referred to was the use of infected clams in Dai Dong. These allegedly carried cholera. Marine clams were found on a hill side by a peasant woman near a reservoir. They were wrapped in a straw. After eating the clams she and her husband died of cholera.¹³

The techniques of dissemination were also examined by the Commission. The Commission relied to some extent on the evidence of the captured US Airmen. Though spraying was the most feasible technique reported, it was believed that a paper package with hardy insects might have been dropped from a height. Another munition mentioned by the Commission was the *air-bursting variable-time fuse leaflet bombs*. These were allegedly used in many cases for insect dissemination. Though the Pentagon denied the charges, it was possible for the US to disseminate bacterial toxins through this method.

The casualties reported in Korea, though, were not clear. It is evident that a plague epidemic broke out at Bal-Nam-Ri. Out of a

population of 600 in the village, 50 were infected with plague and 36 died.¹⁴

Since 1960, there were a number of occasions when biological agents were used. In the summer of 1961, an English-language newspaper in Hong Kong, the 'South China Morning Post', reported a cholera epidemic in the South east of Kwantung province. It had accused agents of the American bacteriological warfare bureau of plotting the cholera epidemic.¹⁵ But the accusation was rejected by the US Department of State. The same allegation was made by Cuba in 1964.

But in the Vietnam War of 1960-68, the most horrifying aspect was the use of biological warfare agents by the United States. In order to reduce the chances of detection, strategic applications against the population required the use of highly epidemic agents which would not spread over large areas. This strategy was applied by the US in Vietnam. In Vietnam, only one agent was thought to be likely to be of use, namely, the Pneumonic Plague, a highly lethal, highly epidemic disease restricted previously to a few river valleys. It is alleged that the United States decided to conduct a biological war against Vietnam, and this is evident from the report of the World Health Organisation (WHO).¹⁶ Direct injuries caused by weapons were by no means the only health disasters brought about by the Vietnam War. Contagious diseases were spread in epidemic proportion within South Vietnam. On 26 October 1966, WHO announced that by October 1966, 306 cases of plague including 22 deaths had been reported in South Vietnam. In all, it was the suspected cause of 2158 cases and 107 deaths.¹⁷ The report further stated that cases of plague had been reported from 24 out of 47 provinces in the South, and plague infections had been found in rodents in several ports and airports including Saigon, Nha Trang, Cam Rahn and Da Nang.¹⁸ In South Vietnam, cholera

increased by hundred per-cent with other intestinal diseases.

The germ warfare report was confirmed by an executive of the New England firm, Traveller's Research Corporation of Hartford, Connecticut. He said that the firm had contracted a project from the Defence Department to adapt bubonic plague for aerial dissemination in South Vietnam.¹⁹ The contract was a crash programme to produce large quantities of the bacilli that induce plague and tularaemia.

Though there were no official charges in all these cases, there have been specific allegations that biological weapons were used against vegetation. According to the North Vietnamese News Agency report of 17 October 1966, some larvae of killer insects were let loose on September 1966 on the Cham Thanh district of Tan province. Route 21 from Duong Zian Hoi to Vinh Cong was affected. All the rice, plants, fruit trees and orchards in a band of 2 kilometers were destroyed.²⁰ Similar incidents had apparently occurred in mid-August in the villages of Huong My, Minh Duc and Cam Sun in the district of Nycay, Mekong Delta. Around the village of Huongny, 40 hectares of young plants were killed. However, in comparison to chemical weapons in Vietnam, the use of biological weapon was less in volume and effect.

The US was not the only one accused of using biological weapons. It is alleged that the erstwhile Soviet Union supplied biological weapons, mainly fungal toxins (Mycotoxins) to government forces, to kill dissident tribal people and enemy soldiers in Laos, Cambodia, and Afghanistan. Though the charges were denied by the Soviet government as well as by the other governments involved, the first major public pronouncement on the subject was made by former US Secretary Alexander Haig on 13 September 1981. He claimed that the US had

obtained good evidence that in addition to a traditional lethal chemical agent, three potent Mycotoxins had been used. The evidence came from the analysis of leaf and stem samples from Cambodia which revealed the use of high levels of mycotoxins. The levels detected were up to twenty times greater than any natural outbreak.²¹ Reports of incidents in which fungal toxins were being used against Laotians and Cambodian villagers became more numerous between 1979 and 1981.

The two major publications on mycotoxin weapons were issued by the US State Department in 1982. The first report referred to 261 separate attacks in Laos in which 6,504 deaths are alleged to have occurred and 124 attacks in Cambodia causing the death of some 981 persons.²² The second report issued by the US State Department alleged the use of mycotoxins and provided the results of analyses on blood and urine samples obtained from the victims. Again by analysis of two contaminated Soviet gas masks acquired from Afghanistan the evidence of mycotoxins use was confirmed.²³ Casualties caused by mycotoxins use are not known in Afghanistan.

The old arguments against the effectiveness of biological warfare still apply. The effects of novel organisms would still be delayed, unpredictable, and difficult to control. In military terms, any advance is almost certainly not a matter of the routine use of bio-technology. Whatever the fact, this double edged weapon still acts like a deterrent against any kind of conventional attack. Empirical evidence suggests that the likelihood of such a war between technologically advanced states is remote as since 1945, the biological weapons have been used only in situations where the victims were unprotected and unable to retaliate.

Endnotes

- 1 SIPRI, *The Rise of CB Weapons: The Problems of Chemical and Biological Warfare Series*, Vol. I, Humanities Press, New York, 1971, p.215.
- 2 There are different theories regarding the 'intent' behind the infected gifts and the consequences. See, R. G. Robertson, *Rotting Face: Smallpox and The American Indian*, Caxton Press, Caldwell (Idaho), 2001, pp.123-124;

Also See, Barbara Alice Mann, *The Tainted Gift: The Disease Method of Frontier Expansion*, Praeger, 2009, p.12
- 3 Frederick R. Sidell, Ernest T. Takafuji, David R. Franz, (eds), *Aspects Of Chemical And Biological Warfare*, TMM Publications, Washington DC., 1997, p.31.
- 4 J. Cookson, and J. Nottingham, *A Survey of Chemical and Biological Warfare*, Sheed and Ward, London, 1969, 54.
- 5 See a discussion on the typhus experiments in Buchenwald, Treblinka and Dachau camps in Naomi Baumslag, *Murderous Medicine: Nazi Doctors, Human Experimentation, and Typhus*, Praeger, 2005, p.59.
- 6 B.J. Bernstein, "Churchill's Secret Biological Weapons," *Bulletin of the Atomic Scientists*, Vol.43, January-February 1987, p.50.
- 7 Cookson and Nottingham, *A Survey of Chemical and Biological Warfare*, p.296.
- 8 S. Murphy, et al., *No Fire, No Thunder*, Pluto Press, London, 1984, p.32.
- 9 Cookson and Nottingham, *A Survey of Chemical and Biological Warfare*, p.297.
- 10 *Ibid.*, p.57.
- 11 SIPRI, *The prevention of CBW: The Problem of Chemical and Biological Warfare Series*, Vol.V, Humanities Press, New York, 1971, p.240.

- ¹² Ibid., p.242.
- ¹³ Ibid., p.250. Also cited in David Rees, *Korea: The Limited War*, Penguin Books, 1970, p. 359.
- ¹⁴ Cookson and Nottingham, *A Survey of Chemical Biological Warfare*, p.58.
- ¹⁵ SIPRI, *The Rise of CB Weapons Today*, p. 226.
- ¹⁶ Ibid., p. 64.
- ¹⁷ Ibid., p.63.
- ¹⁸ Seymour Melman, *Pentagon Capitalism: The Political Economy of War*, McGraw-Hill, 1970, p.145
- ¹⁹ Cookson and Nottingham, *A Survey of Chemical and Biological Warfare*, p.65.
- ²⁰ Ibid.,p.67.
- ²¹ Murphy, et al., *No Fire, No Thunder*, pp.49-50.
- ²² Ibid.,p.52.
- ²³ SIPRI, *World Armament and Disarmament: SIPRI Year Book 1983*, Almqvist & Wiksell, Stockholm, 1983, pp. 394-5.

Saudi Arabia

Ms. Anwasha Raychaudhuri

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Summary

Saudi Arabia signed and ratified the *Biological Weapons Convention* when it was opened for signature in 1972, but that time Saudi's did not have intentions of acquiring biological weapons. Since then, various regional developments have increased the significance of Biological and Chemical Weapons as useful armament.

The Kingdom of Saudi Arabia with its towering presence in the Gulf Region seems to stir up debates over alleged ownership of Chemical and Biological Weapons from time to time. Being signatory to several treaties and conventions, it becomes imperative for the country to clarify its position periodically. Further Saudi Arabia, situated in a region characterized by significant Chemical, Biological and Nuclear weapon proliferation, possesses unlimited resources and infrastructure that encourages it to pursue Nuclear and Chemical and Biological Weapon (CBW) capabilities. A lack of publicly available evidence proves the contrary, yet conditions like threats emanating from Iran and Israel cannot be overlooked and do not deter it from acquiring them. Allegations of support to Pakistani and Iraqi weapons programs also indicate otherwise.¹

Saudi Arabia signed and ratified the *Biological Weapons Convention* when it was opened for signature in 1972, as presumably at that time Saudi's did not have intentions of acquiring biological weapons. Since then, various regional developments have increased the perceived utility of the CBW for Saudi Arabia. Major event in this respect was the 1991 Gulf War where throughout the period of war Saudi Arabia was confronted with CBW threat and its strategic, operational and tactical ramifications.² Saudi perception of vulnerability to threats from the surrounding countries like Iran, Egypt, and Israel may lead it to acquiring these weapons. A likely outcome of threat perception would be to acquire CBW or nuclear capabilities for deterrence and retaliatory purposes in accordance with the *Geneva Protocol of 1925* that bans the use of CBW in wars but not their possession, to which Saudi Arabia is a signatory.³ The fact that Saudi Arabia joined the Geneva Protocol following the bombing of two Saudi sites near Yemen border by the Egyptian Air Force can

not be overlooked in the context of CBW strategy. The motivation and capability to acquire *CBW or* nuclear weapons does not stop here. Further US intelligence reports on comprehensive onsite diagnostic laboratory where large numbers of troops were stationed during Gulf war for CBW threat assessment point to the possible Saudi strategy. In addition, Saudi scientists have carried out basic research relevant to CBWs and other necessary know-how for the same.⁴ Analysts routinely concluded that Saudi Arabia lacks in natural resources, technological capabilities and scientific community to develop advanced sophisticated weapon program. However, going by some business reports, Saudi chemical industries are well developed and have grown considerably in area of biotechnology has taken place over the years.⁵ Parallel to that, Saudi Arabia signed the *Chemical Weapons Convention* in 1993 with a delayed ratification in 1996, which reflects some ambivalence to the treaty and ability to acquire CBW.⁶ Hence, all this coupled with enormous wealth would not make it impossible for Saudi Arabia to source necessary ideas and resources to develop CBW capacity. That apart, the possibility of outside assistances cannot be overlooked, and in this case Saudi Arabia could look towards Pakistan which has been its major ally.⁷ Then again, Saudi authority would be careful not to invite international isolation and harm to *US-Saudi* relations that would result from such an act.⁸

Any other motivation to acquire or possess weapons by Saudi Arabia could be attributed to purposes of deterrence and defense, although other possible rational like prestige or regional hegemony do seem to exist, they do not seem reasonable or relevant enough causes for pursuing CBW capacity. Israel's possession of chemical, biological and nuclear weapons and its threats to Saudi Arabia in addition to the other neighbouring countries'

CBW capacities may increase Saudi perception of threats. Perception of CBW as relatively cheap and easy way of keeping enemy forces at bay in sparsely populated areas, along with the above mentioned factors can determine the CBW strategy of Saudi Arabia.

It is worthwhile to conclude that future motivation to acquire CBW or nuclear weapons by Saudi Arabia could be attributed to Gulf War of 1991 and its geostrategic location. The necessity to counterbalance intensifying unconventional threats towards Saudi Arabia since the end of *Gulf War* might prove otherwise. The strategic military protection furnished by the United States could form an equilibrium, nevertheless Saudi Arabia could be named as "threshold state rather than a potentially capable state"⁹ for building and acquiring CBW or nuclear program. Further Israel's possession of nuclear weapons casts doubt on likelihood of American retaliation due to its relations with the Israel and presumably risk of potential weapon escalation. Officially Saudi Arabia denies the possession of any sort of weapons or facilities to develop one. However, any future movement in that direction might be inevitable with the changing dynamics of political relations in and around it. Foreign assistances and resources are abundant, that might not be a hindrance for case of Saudi Arabia with its wealth. In summary, it appears that Saudi Arabia has geostrategic incentives to acquire weapon capabilities; it already possesses the necessary infrastructure and has the capacity to import assistance to produce equipment that cannot be produced domestically. Thus, Saudi Arabia could likely pursue a CBW or nuclear capability if not already for afore mentioned factors.

Endnotes

¹ NTI: Research Library: Country Profiles: Saudi Arabia Nuclear Overview, available

on [www.nti.org/e_research /profile/
Saudi _Arabia/Nuclear/index.html](http://www.nti.org/e_research/profile/Saudi_Arabia/Nuclear/index.html),
accessed 26/11/2010

- 2 Dany Shoham , “Does Saudi Arabia Have or Seek Chemical or Biological Weapons?”, *The Non proliferation Review*, Spring-Summer, 1999, p.122
- 3 Ibid, p.123
- 4 CBW Conventions Bulletin, No 42, 1998, p.29
- 5 Mubarak Al Khafrah, “The Future Prospects for Industry in Saudi Arabia”, paper delivered to Confederation of British Industry Conference , July 15th 1994 and The Saudi Arabia Biological Society, Proceedings of the First Arab Gulf Conference on Biotechnology and Applied Microbiology, Riyadh, November 1984
- 6 Danny Shoham, p.127
- 7 Marie Colvin, “How an insider lifted the Veil on Saudi Plot for an Islamic bomb”, *Sunday Times*, London, July 24, 1994, LexisNexis
- 8 Arnaud De Borchgrave, Pakistan, Saudi Arabia in Secret Nuke Pact, “*Washington Times*, October 22, 2003
- 9 Ibid, p. 128

Kaleidoscope

VERTIC

There are a number of organisations that support the cause of arms control and disarming the world of biological weapons. Amongst them VERTIC (the Verification Research, Training and Information Centre) hold an important position. This organisation is based in London, UK. Whereas the treaty mechanisms to ban the use, production and proliferation of biological weapons are enshrined in BWC, VERTIC plays a crucial role in the implementation of the BWC. The organisation “focuses on agreements and initiatives in the areas of arms control, disarmament and the environment, with particular attention to issues of monitoring, review and verification.”¹

As regards its mandate, VERTIC is an independent organisation funded by numerous charitable organisations, trusts and by various state parties. According to VERTIC, “major funders are Chatham House, the Ford Foundation, the Government of Norway, the Government of Canada (Global Partnership Programme), the Joseph Rowntree Charitable Trust, the Norwegian Radiation Protection Authority (NRPA), the Ploughshares Fund, the Strategic Programme Fund of the UK Foreign and Commonwealth Office (FCO), the UK Ministry of Defence (MOD) and the US State Department (Biosecurity Engagement Programme)”.² “The mission of VERTIC is to “support the development, implementation and effectiveness of international agreements and related regional and national initiatives”.³ The most relevant contribution of VERTIC is to involve all the stakeholders in the biological weapons control debate in the global disarmament regime. Consultations held at various stages involve academics, policy makers, and private and public sector companies alike. VERTIC offers both consultancy and expert

advice on various matters related to monitoring, verification and implementation of various treaties.

VERTIC has three broad research programmes. These are, first Arms control and disarmament, second **National Implementation Measures (NIM)** and third, the environment.⁴ VERTIC maintains an overview of the multilateral agreements pertaining to arms control and disarmament in its first research programme. According to the VERTIC, **The National Implementation Measures (NIM) programme** “assists States in understanding what measures are required at the national level to comply with the prohibitions in the nuclear, biological and chemical weapons treaties and UN Security Council resolutions and provides support to implement them”.⁵ The main focus of this programme is the successful implementation of UN Security Council Resolution 1540 (UNSCR 1540).

Endnotes

- ¹ <http://www.vertic.org/>
- ² Ibid.
- ³ Ibid.
- ⁴ Ibid.
- ⁵ Ibid.

ARMS CONTROL

White House issues fact sheets on Obama's India visit

The White House has issued a series of fact sheets about the US-India "strategic relationship (that) encompasses a range of issues, activities, and programmes that reflect the vision of President (Barack) Obama and Prime Minister (Manmohan) Singh".

Extracts from the fact sheets:

Export Controls: Manmohan Singh and Obama agreed to take mutual steps to implement a four-part export control reform programme, including: support for India's membership in the multilateral export control regimes, removing India's defence and space-related entities from the US "Entity List;" export licensing policy realignment, and export control cooperation.

Partnership for an Evergreen Revolution: Manmohan Singh and Obama agreed to work together to develop, test, and replicate transformative technologies to extend food security in India as part of an "Evergreen Revolution". These efforts will benefit farmers and consumers in India, the US, and around the globe, and will extend food security in India, Africa and globally.

Counterterrorism Cooperation: Since the first bilateral discussions on counterterrorism in 2000, counterterrorism cooperation has become a pillar of the US-India relationship. In the aftermath of the Mumbai terrorist attacks, the US and India resolved to deepen collaborative efforts, and intensify exchanges, culminating in the signing of the Counterterrorism Cooperation Initiative (CCI) in July 2010.

Civil Space Cooperation: Obama and Manmohan Singh agreed to scale-up joint

US-India civil space collaboration, including space exploration, earth observation, and scientific education.

Clean Energy and Climate Change: Manmohan Singh and Obama reaffirmed their countries' strong commitment to taking vigorous action to address climate change, ensure mutual energy security, and build a clean energy economy that will drive investment, job creation, and economic growth throughout the 21st century.

Cybersecurity: Recognising the importance of cybersecurity, the US and India are advancing efforts to work together to promote a reliable information and communications infrastructure and the goal of free, fair, and secure access to cyberspace.

CEO Forum: Recognising the vital role bilateral commerce plays in the global strategic partnership, Obama and Manmohan Singh highlighted the importance of the US-India CEO Forum and the progress made in implementing its recommendations.

Defence Cooperation: The US-India defence relationship has grown from solely military-to-military links into a mature partnership that encompasses dialogues, exercises, defence sales, professional military education exchanges, and practical cooperation.

US-India Economic and Financial Partnership: Since the launch of the new US-India Economic and Financial Partnership in April 2010, the two governments have institutionalised deeper bilateral relations on economic and financial sector issues. These efforts include a macroeconomic dialogue and financial sector and infrastructure working groups.

Education: Obama and Manmohan Singh are committed to an expanding, dynamic, and

comprehensive education partnership, including expanding academic exchanges, developing university and school linkages, and holding a US-India Education Summit.

Entrepreneurs Roundtable: This event introduced the president to the next generation of Indian entrepreneurs and showcased innovative partnerships between US and Indian businesses that are creating new markets for US-manufactured technologies.

The National Export Initiative: As part of the National Export Initiative, Obama noted that India-with its tremendous economic growth and its large and growing middle class-is a key market for US exports. On the margins of the president's trip, trade transactions were announced or showcased, exceeding \$14.9 billion in total value with \$9.5 billion in US export content, supporting an estimated 53,670 US jobs.

Indian Investment in the US: As the US-India economic relationship deepens, investment from India contribute to the growth and vibrancy of the American economy and in the creation of jobs in the US. Over the last decade, investment capital from India grew at an annualised rate of 53 percent reaching an estimated \$4.4 billion in 2009.

Nuclear Security: The US and India signed a memorandum of understanding that provides a general framework for cooperative activities in working with India's Global Centre for Nuclear Energy Partnership, which India announced at the 2010 Nuclear Security Summit.

Deepening US-India Strategic Ties: Manmohan Singh and Obama renewed their commitment to expand cooperation on strategic issues facing the US and India and agreed to deepen and broaden strategic consultations on core foreign policy issues of mutual concern.

US-India Development Collaboration in Afghanistan: Obama and Manmohan Singh agreed to collaborate closely to assist the people of Afghanistan by identifying opportunities to leverage the two countries' relative strengths, experience and resources. The collaboration will focus on agricultural development and women's empowerment, where Afghanistan's needs are great.

Securing the Air, Sea, and Space Domains: Obama and Manmohan Singh agreed that in an increasingly interconnected world, it is vital to safeguard areas of the sea, air, and space beyond national jurisdiction to ensure the security and prosperity of nations.

Source: <http://www.hindustantimes.com/White-House-issues-fact-sheets-on-Obama-s-India-visit/Article1-623799.aspx>

DISARMAMENT

Nato's new strategic concept calls for dramatic change in alliance priorities

Nato leaders have backed a new strategic concept for the transatlantic alliance that shifts its priorities from defending Europe against Cold War adversary Russia to focus against new, unconventional threats.

Anders Fogh Rasmussen, Nato's secretary-general, said the alliance would have to "develop modern capabilities to deal with modern threats".

The strategic concept - updated every 10 years and released yesterday - acknowledges that that the threat of a "conventional military attack against Nato territory is low".

Instead terrorism, the use of biological, chemical and radiological weapons, nuclear and ballistic missile proliferation, cyber-attacks, and conflicts that could disrupt

energy and trade routes are at the forefront of Nato fears.

Building on lessons from Afghanistan, the strategic concept calls on Nato to "further develop doctrine and military capabilities for expeditionary operations, including counter-insurgency, stabilisation and reconstruction".

It also gives special priority to efforts to develop a strategic relationship with Russia.

Mr Rasmussen said the Lisbon summit would work to bring about a "fresh start" in relations.

Dmitry Medvedev, Russia's president, is to meet alliance leaders today to discuss Russia's possible participation in a Nato ballistic missile defence shield designed to prevent attacks from potential nuclear adversaries such as Iran.

In return Russia will seek Nato action against Afghan opium fields.

"In light of the reluctance to destroy the poppy fields, you can ask yourself why Nato's troops are there at all," said Viktor Ivanov, the head of Russia's drug control agency.

17,000 munitions in 4 months: Op Saiyam is a test of patience

It was a disaster waiting to happen. For six years, five containers of munition - a mix of ammunition and war material - weighing nearly 50 tonnes lay dangerously unattended at two dry ports in Dhandri Kalan in Ludhiana. Seized by the Customs Department, the war scrap is part of the same consignment that caused a massive blast at Bhushan Steel Industry in Ghaziabad in 2004.

Imported from Gulf countries in the garb of metal scrap by nine firms located in Mandi Gobindgarh and Ludhiana to be recycled into

steel, the war scrap has been found to contain mainly mortar bombs, projectiles, grenades, rockets, detonators and artillery shells with no traces of any chemical weapons. The process of its disposal has finally begun with the Army employing sophisticated remotely operated vehicles (ROVs) to segregate the war scrap, given the potential hazard involved.

Operation Saiyam kick-started on November 10 with 202 Bomb Disposal Company of the Army executing the disposal at a site in Mattiwara Reserve Forest area near Ludhiana. The containers were first transported at night from the Dry Port to the disposal site located 43km away. "It was a daunting task due to the potential danger to population residing enroute," said Maj Gen VK Bhatt, Chief Engineer, Western Command, Chandimandir and overall in-charge of the command and control of the operation.

The disposal of the scrap has been divided into three phases - holding, segregation and demolition. "After the ROV has segregated the scrap, the same is shifted to the demolition area where the bomb disposal unit has made safe and secure sites for detonation," said Lt Col Vinod Bhat, Commanding Officer, 202 Bomb Disposal Company, who is leading the disposal operations on site. Bulldozers and excavator-loaders are also in use.

It has taken the bomb disposal unit a few months to prepare for the operation and the work group comprises two officers, three Junior Commissioned Officers and 35 other ranks.

The villages near the area - Shekonwal, Kalewal and Haider Nagar have had to be evacuated. "The total number of munitions is approximately 17,000. Given the enormity, we don't want to take a chance. The police and the civil administration have

been roped in to cordon off the area every day," said the Commanding Officer.

So far, 875 munitions have been destroyed. "It's a long drawn operation but of immediate importance," said the Chief Engineer. For security and safety aspects, a joint Police and Army Control Centre has been established at the site.

"The villagers have complained of harassment due to the nature of operation resulting in day to day evacuations. Keeping that in mind, we have made alterations in the timings. Also, from November 24 to 28, there will be no demolitions as there are marriages scheduled in these villages," said Lt Col Bhat. The Army is hoping to complete Operation Saiyam in a maximum of four months' time. The estimated cost of the operation is over Rs 1 crore and it will be recovered from the importers of this consignment.

A requisition for the disposal of the munition was first received by the Army from the Punjab Government in June 2004. Since then, the preparations for Operation Saiyam were carried out but it was called off four times. "That was mostly because the civil administration failed to seek clearances from the Ministry of Defence and the Ministry of Environment. Other requirements, such as grant of battle casualty status delayed it further," said Maj Gen Bhatt. With the Punjab and Haryana High Court issuing directives to speed up the process, the first set of demolitions were carried out on November 16 and will continue till the entire scrap has been safely disposed of.

Source: <http://www.telegraph.co.uk/news/newstoppers/politics/defence/8148154/Natos-new-strategic-concept-calls-for-dramatic-change-in-alliance-priorities.html>

Global Campaign to Destroy Chemical Weapons Passes 60 Percent Mark

The destruction of chemical weapons that have been declared to the OPCW by States Parties under the provisions of the Chemical Weapons Convention (CWC) has surpassed 60 percent of global stockpiles, according to data reported today by the OPCW Technical Secretariat in The Hague.

The Technical Secretariat has now verified the destruction of approximately 41,692 metric tonnes, or 60.05 percent, of all Category 1 chemical weapons that have been declared by seven possessor States since the Convention's entry into force on 29 April 1997.

"Reaching this milestone is surely the OPCW's main achievement to date, bringing us ever closer to realizing the vision of a world free of these horrific weapons," said the OPCW Director-General, Ambassador Rogelio Pfirter. "The strong commitment shown by the possessor States in fulfilling their obligations proves that complete chemical disarmament under the terms of the Convention is indeed an attainable goal, and has made a significant contribution to international peace and security."

Three of the possessor States - Albania, India, and a State Party that requests anonymity - have already completed destruction of their chemical weapons. The two countries with the largest stockpiles, the Russian Federation and United States of America, have met their intermediate destruction deadlines set by the Convention and are accelerating their activities. The Russian Federation has destroyed nearly 48 percent of its stockpiles to date and the United States just over 75 percent; however, both countries have confirmed that they will not complete destruction of their weapons before the 29 April 2012 deadline.

The two most recently declared possessor States – Iraq, which joined the Convention in 2009, and the Libyan Arab Jamahiriya, which joined in 2004 – have yet to begin destruction activities.

The Chemical Weapons Convention is the first and only treaty that is designed to eliminate an entire category of weapons of mass destruction under a stringent regime of inspections to verify compliance. Since its entry into force in 1997 the Convention has attracted 188 States Parties representing more than 98% of the world's population and chemical industry. The OPCW Technical Secretariat currently commits 85% of its inspection resources to monitoring and verifying the destruction of chemical weapons stockpiles and their associated production facilities.

Source: <http://www.opcw.org/news/article/global-campaign-to-destroy-chemical-weapons-passes-60-percent-mark/>

Media Update: Third Exercise on the Delivery of Assistance (ASSISTEX 3)

From 11-15 October 2010 the OPCW will conduct its third exercise on the delivery of assistance and protection to States Parties against the use of chemical weapons. The exercise, ASSISTEX 3, is being jointly planned with the Government of Tunisia and will be held at the 7 November Sport Complex at Rades, in Tunis.

Members of the international media are invited to observe the second day of the Live Exercise phase of ASSISTEX 3 on Thursday, 14 October 2010.

The scenario for this multilateral exercise will focus on the OPCW's response to a request for assistance by a State Party that has been threatened and attacked with chemical weapons. Participants will include specialised

teams from Denmark, France, India, Italy, Libya, South Africa, Spain, Switzerland, Tunisia, Turkey and the United Kingdom, together with personnel from the OPCW Technical Secretariat in The Hague and UN Office for the Coordination of Humanitarian Affairs.

Media programme

The ASSISTEX 3 media programme on 14 October will take place at the 7 November Sport Complex in Rades, beginning with a pre-briefing on ground rules at 08.30 and concluding at 16:00, with lunch and beverages provided on-site. The two main programme elements will be:

1. Tour of the exercise grounds with access to all activities for audiovisual filming and to technical experts who will explain the content and purpose of each activity.
2. Informal briefing by the OPCW Director-General, Ambassador Ahmet Üzümcü of Turkey.

There will also be a VIP demonstration exercise and closing ceremony on Friday 15 October, followed by a concluding press conference at 15:00.

Source: <http://www.opcw.org/news/article/media-update-third-exercise-on-the-delivery-of-assistance-assistex-3/>

NATIONAL AND INTERNATIONAL DEVELOPMENTS

A first of its Kind for India: National Authority for Chemical Weapons Convention gets ISO 9001 Certification Commended by OPCW

This is part of Prime Minister's efforts to enhance administrative efficiency and

accountability of Government departments. The National Authority for Chemical Weapons Convention (NACWC), a part of Cabinet Secretariat has been commended by the premier world body, the Organization for the Prohibition of Chemical Weapons (OPCW) on getting ISO 9001:2008, Certificate. This is part of Prime Minister's efforts to enhance administrative efficiency and accountability of Government departments. The award is in recognition of the highly successful performance of the National Authority. India's Ambassador to Netherlands Ms. Bhaswati Mukherjee presented a copy of the certificate to the Director General Of the OPCW at a function in Hague on Thursday. The Director General of the OPCW, Mr. Ahmad Uzumen said that the Indian example is a role model for other countries. Australian representative Josey Meyers lauded India's role and said it will ensure high quality outputs from the National Authority. US Ambassador and Permanent Representative to OPCW ,Dr. Robert Mikulak has hailed it as an impressive achievement.

At a function organized on the sidelines of the 15th Conference of the States Parties, the Chairman of National Authority and other members of the Indian delegation made a presentation on the aim, objectives and process for obtaining the ISO 9001 certification by Bureau Veritas, world's leading certification body based in France. It was very well attended by over 70 participants from different Regional Groups including those from Africa . At least 15 Ambassadors including the Ambassadors from Netherlands, United States, Italy, Pakistan, Sri Lanka and several African countries were present. Indian embassy in Netherlands has already received may requests already regarding future technical assistance that can be provided by National Authority.

The ISO 9001 Certificate makes the National Authority for Chemical Weapons Convention (NACWC) the first among all 188 member nations of OPCW to attain this distinction. It is also the first Government of India department to have qualified for ISO 9001:2008 certification. . The Cabinet Secretary, Mr. K. M. Chandrasekhar, who is leading the reform effort in the Government, has asked other government departments to follow the example of his department. It is part of Cabinet Secretariat's integrated policy of performance management in Government. The integrated system for defining, documenting, improving, communicating and auditing of processes has already led to considerable improvements in the operations of the Indian National Authority both in quantitative and qualitative terms. The Indian delegation has been approached by several countries including Japan, Sri Lanka, Italy, Kenya, Uganda, etc. for information and technical assistance for obtaining similar certification for their respective national authorities.

Source: <http://pib.nic.in/release/release.asp?relid=68077>

Russia to Destroy Chemical Arsenal Prior to 2015, Official Says

A high-ranking Russian official on Tuesday said his country would finish disposing of its chemical weapons arsenal before 2015, Interfax reported .

Moscow acknowledged in June it would not be able to meet the Chemical Weapon Convention's April 2012 deadline for the complete destruction of all chemical warfare materials.

"A decision has nearly been made to extend the program until 2015. All commitments will have been fulfilled by this time," said

Valery Kapashin, who leads the Federal Directorate for the Safe Storage and Destruction of Chemical Weapons..

The global recession and technical difficulties have negatively impacted Russia's ability to meet the 2012 deadline, according to published reports.

Most member nations to the convention-monitoring Organization for the Prohibition of Chemical Weapons recognize the challenges facing the Russian disarmament effort, the Russian Foreign Ministry said.

Russia at one time possessed the world's largest stockpile of chemical warfare materials – 40,000 metric tons. As of the beginning of September, nearly 50 percent of the arsenal had been eliminated.

Source: http://www.globalsecuritynewswire.org/gsn/nw_20101118_5924.php

Vietnam still poisoned by US chemical weapons

The side-effects of the Vietnam War are destroying thousands of lives, with many Vietnamese saying no amount of US compensation can give them back their health.

-Vietnam may be one of only five socialist states in the world, but its economic progress is notable.

Business is booming, high rise offices sprout up everywhere, and the people have opportunities to improve their lives.

However thousands of Vietnamese struggle, and not for financial reasons.

The saying 'all is fair in love and war' has been used to justify many military decisions. But when, during the Vietnam War, the United States began deploying a new chemical weapon they named Agent Orange,

not many could have predicted that those who will suffer from it most will not be soldiers on the battlefields, but their children, most of whom were not even born at the time.

Vu Thi Huong is 34 years old, but you would never guess her age by looking at her. Born blind and with many severe physical difficulties, she is fed and bathed by her parents to this day.

However, her life was taken away from her before she was even born.

"My daughter was born blind, and we didn't know why until we took her to the hospital in 1981 and the doctors did some blood tests. That's when they said she was affected by Agent Orange. It's very difficult, taking care of her – because she is completely helpless, completely dependent on us," says Vu Thang Kim, Thi Huong's father and a war veteran.

For a decade, American jets dispersed 80 million litres of the new herbicide over the territory of Vietnam.

Operation Ranch Hand did not win the war, but did achieve its goal of destroying tens of millions of hectares of agricultural fields, and also exposed nearly 5 million people to its deadly poison.

Half a million children in Vietnam were born with severe physical and mental disabilities – all because of Agent Orange.

Neither the US government nor the chemical companies that made the herbicide have paid a single cent in compensation to those whose lives were destroyed by their work.

Their only relief has come from the Vietnamese Government and various international organizations like the Red Cross, who set up the so-called Peace Villages.

In these settlements, affected children get their chance to live a life with as much normality as their conditions allow.

They study in a school on site, play with friends living in the nearby village and get medical and physical treatment from doctors.

But not many of them will ever grow to be fully independent and self-sufficient adults.

“Even if the United States paid some compensation for what they did...no money can give my daughter her life back. Nothing can pay for this pain,” Vu Thang Kim says.

Source: <http://rt.com/news/vietnam-war-chemical-weapons/>

Head of MI6 warns of biological, chemical weapons

In the first public speech given by the head of the British intelligence services, Secret Intelligence Service chief John Sawers said on October 28 that terrorists may yet hit the West with a devastating blow, but that the real threat remains biological, chemical and nuclear weapons proliferation by states.

“The dangers of proliferation of nuclear weapons and chemical and biological weapons are more far-reaching,” Sawers, whose century-old service is popularly known as MI6, said, according to Reuters. “It can alter the whole balance of power in a region.”

Sawers gave the comments to the Society of Editors media group at the Thomas Reuters London offices. He said the risks of failure in confronting countries like Iran are grim, according to Reuters.

“Terrorism is difficult enough, and despite our collective efforts, an attack may well get

through,” Sawers said, Reuters reports. “The human cost would be huge. But our country, our democratic system, will not be brought down by a typical terrorist attack.”

Sawers defended the secrecy of British intelligence, particularly that of MI-6, and its ties to Muslim countries that have poor human rights records. His comments came in the wake of the Wikileaks website whistleblowing that demonstrated how coalition forces ignored torture by Iraqi security forces.

“We are the secret frontline of our national security,” Sawers said. “Secrecy is not a dirty word. Secrecy is not there as a cover up. Secrecy plays a crucial part in keeping Britain safe.

“We have to deal with the world as it is...We can’t do our job if we work only with friendly democracies. Dangerous threats usually come from dangerous people in dangerous places.”

Source: <http://www.bioprepwatch.com/news/219118-head-of-mi6-warns-of-biological-chemical-weapons>

Powder-Filled Envelopes Sent to Israeli Lawmakers

Four ultra-Orthodox lawmakers in Israel this week received hate mailings delivered in envelopes containing a suspicious white powder, Agence France-Presse reported.

The head of the ultra-Orthodox Shas party, Interior Minister Eli Yishai, also received one of the letters, said Israeli police spokesman Micky Rosenfeld.

“A white powder found inside has been sent to the lab and we are awaiting the results of testing,” Rosenfeld said.

A number of Knesset members received suspicious envelopes this week, Knesset spokesman Giora Fordes said.

“Four MPs from the United Torah Judaism party received threatening letters, two today [Monday] and two yesterday,” Fordes said.

“In one of them was powder — sugar, salt, something like that,” he said, adding the letters were critical of the divisive policy that grants ultra-Orthodox Israelis pursuing religious studies a waiver from mandatory military service.

“We, the enlightened residents of the State of Israel, demand that you people of darkness stop living at our expense, learning all day and not working, not serving in the army or reserve duty,” the *Jerusalem Post* quoted one of the letters as stating.

Source: http://www.globalsecuritynews.wire.org/gsn/nw_20101123_7110.php

Advanced Training Course for Personnel from National Authorities in Asia Held in Singapore

A 4-day Advanced Training Course for Personnel from National Authorities in Asia took place in Singapore from 1 to 4 June 2010. A total of 23 participants from 21 States Parties in the Asia-Pacific region participated in the training.

The course was organised by the OPCW in cooperation with Singapore Customs, which is the National Authority for the Chemical Weapons Convention (CWC), and was the first of its kind conducted on a regional basis. The course provided training to personnel with experience of working in National

Authorities and dealing in particular with Article VI declarations and inspection-related issues.

The course included a number of practical exercises and scenario discussions for the collection of relevant information in preparing Article VI declarations; the application of thresholds in the Verification Annex of the CWC and subsequent decisions of the policy making organs of the OPCW to make accurate Article VI declarations; the availability of different tools that the National Authorities could use to widen the scope of their efforts to collect relevant data at a national level; and the monitoring and collection of data for the import-export of scheduled chemicals.

An important element of the course was to provide practical training through a mock inspection exercise, including a detailed preparatory session devoted to the conduct of OPCW inspections. The mock inspection was designed to offer more information to the participants on the inspection procedures adopted by the OPCW inspectors during Article VI inspections and the role of national escorts in facilitating the smooth conduct of OPCW inspections.

Participants also shared experiences about the role played by the National Authorities in performing specific tasks, including outreach to industry to create awareness about the requirements of the Chemical Weapons Convention, on-going contact with facilities to be inspected by the OPCW, and other administrative and logistic arrangements to be made for OPCW inspections.

Source: <http://www.opcw.org/news/article/advanced-training-course-for-personnel-from-national-authorities-in-asia-held-in-singapore/>

OPCW Director-General Opens 8th Regional Meeting of CWC National Authorities from Asia in Kuwait

The OPCW Director-General, Ambassador Ahmet Üzümcü, opened the 8th Regional Meeting of National Authorities in Asia held in Kuwait City from 1 to 3 November 2010. The meeting was attended by more than 45 participants from 29 States Parties and co-hosted by the National Authority of Kuwait. The meeting was formally opened by the First Deputy Prime Minister and Defense Minister of Kuwait, H.H. Sheikh Jaber Al Mubarak Al-Hamad Al-Sabah.*

During his visit Director-General Üzümcü also held bilateral discussions with the First Deputy Prime Minister and Defense Minister; with the Under-Secretary of Defense, Mr Jasar Al Jasar; and with the Under-Secretary of Foreign Affairs, Mr Khalid Al Jarallah. The Director-General thanked the officials for Kuwait's firm commitment to the Chemical Weapons Convention (CWC) and for its support to the OPCW. He also stressed the importance of full and effective implementation of the Convention and the need for all States Parties, including Kuwait, to adopt comprehensive national legislation to ensure CWC implementation as soon as possible.

In his remarks to the regional meeting, the Director-General stated that close collaboration among States Parties in implementing the CWC is an example of the kind of multilateralism in action that makes the OPCW a unique international organization. The Director-General highlighted universality as another key factor underpinning the Convention's success. He noted that the OPCW currently counts 188 States Parties and that of the seven countries remaining outside the

Convention, three are in the Asia region – the Democratic People's Republic of Korea, Myanmar, and Syria. While some States not Party link their adherence to other issues such as regional security, the Director-General said removing this linkage and joining the Convention would enable those countries to demonstrate their commitment to international peace and security.

The regional meeting offered a platform for participating National Authorities and the Technical Secretariat to exchange information and experiences on different aspects relating to industry verification. Participants exchanged views on enhancing regional and sub-regional cooperation and identified areas for possible cooperation. A number of bilateral meetings were held between participating National Authority representatives and the Secretariat staff on national implementation issues.

* Afghanistan, Bahrain, Bangladesh, Bhutan, Cambodia, Fiji, India, Indonesia, Iraq, Japan, Republic of Korea, Kuwait, Kyrgyzstan, Lebanon, Malaysia, Mongolia, Nepal, Oman, Pakistan, Palau, Qatar, Samoa, Saudi Arabia, Sri Lanka, Thailand, United Arab Emirates, United States of America, Viet Nam, Yemen.

Source: <http://www.opcw.org/news/article/opcw-director-general-opens-8th-regional-meeting-of-cwc-national-authorities-from-asia-in-kuwait/>

RECENT DEVELOPMENTS IN SCIENCE AND TECHNOLOGY

New Sensor Could Detect Quickly Viral Bioterror Agents

Scientists at Boston University have developed a biological sensor that could be used to rapidly detect a wide range of viral pathogens including the lethal Ebola and Marburg viruses, the institution announced in mid August.

As with other viruses that produce symptoms not necessarily indicative of viral infection, Marburg and Ebola outbreaks can be challenging to diagnose. The situation could be further complicated by the current reliance on diagnostic systems that need substantial supporting infrastructure and require a lengthy period for biological sample preparation.

The developmental biodetector, however, is capable of sensing active viruses with “little to no” sample preparation, according to a Boston University press release.

“Our platform can be easily adapted for point-of-care diagnostics to detect a broad range of viral pathogens in resource-limited clinical settings at the far corners of the world, in defense and homeland security applications as well as in civilian settings such as airports,” research team leader Hatice Altug said in released comments. “By enabling ultraportable and fast detection, our technology can directly impact the course of our reaction against bioterrorism threats and dramatically improve our capability to confine viral outbreaks.”

The scientists received university funding as well as financing from the U.S. Army Research Laboratory. Through joint research with the U.S. Army Medical Research Institute of Infectious Diseases, they were able to prove the biodetector’s capability to sense in a typical laboratory environment the presence of hemorrhagic fever virus surrogates and pox viruses such as smallpox or monkeypox.

Ebola and Marburg viruses cause hemorrhagic fever in humans and are classified as high-risk agents that could be used in a biological weapons attack. Smallpox has also been identified as a potential bioterror agent.

“The new biosensor is the first to detect intact viruses by exploiting plasmonic nanohole

arrays (PNAs), or arrays of apertures with diameters of about 250 to 350 nanometers on metallic films, that transmit light more strongly at certain wavelengths,” according to the press release.

“When a live virus in a sample solution, such as blood or serum, binds to the sensor surface, the effective refractive index in the close vicinity of the sensor changes, causing a detectable shift in the resonance frequency of the light transmitted through the nanoholes. The magnitude of that shift reveals the presence and the concentration of the virus in the solution,” the release states.

The scientists are developing a miniature version of the detector that is intended for field use. The researchers intend to test the sensor with Marburg and Ebola samples. Additional testing is to follow in African nations where incidents of hemorrhagic fever infection are found.

Source: http://www.globalsecuritynews.wire.org/gsn/nw_20101124_7290.php

Pharmaceutical Industry is facing Biological Warfare

It is a new battle for the drugs industry, and it will be hard-fought. U.S. and European regulators are debating guidelines for approving “biosimilars,” which would allow copies of cancer and multiple-sclerosis treatments to be developed for the first time. That is a big threat for biotech firms and pharmaceutical companies like Roche. It is also a huge opportunity for generics players.

Biological treatments are proteins manufactured in living cells, rather than chemical-based drugs. Biotech firms including Amgen and Biogen, and pharmaceutical companies like Pfizer, Novo Nordisk and Roche are key players in a market worth some \$100 billion in annual sales.

Biologics are complex to manufacture. They command high prices. And although companies face a wave of patent expirations from 2014, there are no mechanisms for approving generic copies for the majority of these products. That means biotech specialists tend to trade at a premium to peers with products more at risk from generic competition. The premium is now under threat.

Guidelines for approving a raft of biosimilars, or copies of biological drugs, are expected in Europe later this month. Sure, the threat has been known for years, but the market may be underestimating the impact. Credit Suisse has forecast a 5%-10% annual decline in sales of biological treatments once patents expire, but that looks conservative.

Patent expirations on conventional drugs have caused sales to fall at rates of up to 80% per year. True, biosimilars have much higher barriers to entry. While generic drugs can typically be developed for under \$5 million, biosimilars can take twice the time and cost as much as \$200 million each. Regulators may require extensive clinical trials to approve them. Doctors may be reluctant to prescribe “copycat” treatments. Patent holders will also fight to protect sales, refining their drugs or making them easier to administer.

But pharmaceutical firms accept that biosimilars will eventually be approved, not least because governments need to facilitate the development of cheaper drugs. Biosimilar sales could rise from \$250 million last year to \$20 billion by 2020, estimates generics manufacturer Sandoz, a division of pharmaceutical firm Novartis. The world’s largest generics firm, Teva Pharmaceuticals, is already testing its version of Roche’s blockbuster cancer and arthritis drug Rituxan. Pfizer, too, is beefing up its generics business.

Roche’s historic 20%-30% premium to peers has all but disappeared as the risks to its drug portfolio have become clearer. And generics firms look like the winners. Teva now trades at 11.5 times this year’s earnings, a fraction above the global pharmaceutical sector. That is still behind biotech specialists like Novo Nordisk. But as opportunities for biosimilars develop, the balance could tip further in generic manufacturers’ favor.

Source: <http://online.wsj.com/article/SB10001424052748703567304575628821644998204.html>

National Authority for Chemical Weapons Convention gets ISO 9001 Certification

In a first of its kind, the National Authority for Chemical Weapons Convention (NACWC), a part of the Cabinet Secretariat, has got ISO 9001:2008 certification.

The Organisation for the Prohibition of Chemical Weapons (OPCW), based in The Hague, has commended the NACWC for this achievement, which is in recognition of its successful performance.

India’s Ambassador to the Netherlands, Ms Bhaswati Mukherjee, presented a copy of the ISO certificate to OPCW Director General Ahmad Uzumen at a function at The Hague on Thursday.

Mr Uzumen said the Indian example was a role model for other countries, while Australian representative Josey Meyers lauded India’s role in this area. US Ambassador and Permanent Representative to OPCW, Dr. Robert Mikulak, has hailed it as an impressive achievement.

At a function organized on the sidelines of the 15th Conference of the States Parties, the Chairman of NACWC and other members of the Indian delegation made a presentation

on the aim, objectives and process for obtaining the ISO 9001 certification by Bureau Veritas, world's leading certification body based in France.

It was attended by over 70 participants from different Regional Groups including those from Africa . At least 15 Ambassadors including the Ambassadors from Netherlands, United States, Italy, Pakistan, Sri Lanka and several African countries were present. Indian embassy in Netherlands has already received many requests regarding future technical assistance that can be provided by NACWC.

The ISO 9001 Certificate makes the NACWC the first among all 188 member nations of OPCW to attain this distinction. It is also the first Government of India department to have qualified for ISO 9001:2008 certification.

This is part of the Prime Minister's efforts to enhance administrative efficiency and accountability of Government departments, an official press release said.

Cabinet Secretary K. M. Chandrasekhar has asked other government departments to follow the example of this department, the release added.

Source: <http://netindian.in/news/2010/12/04/0008948/national-authority-chemical-weapons-convention-gets-iso-9001-certification>

Russia opens new chemical weapons destruction plant

Russia has launched a new facility to destroy its Soviet-era chemical weapons stockpiles, the country's technological watchdog Rostekhnadzor said.

The plant in the town of Pochep, located 250 miles southwest of Moscow, is a sixth facility built in recent years to meet Russia's international obligations to destroy all its chemical weapons by April 2012.

"The technology used at the Pochep facility allows us to completely destroy not only chemical agents and products of detoxification, but also the munitions," head of Rostekhnadzor, Nikolai Kutuyin was quoted by the agency's press service on Saturday.

Rostekhnadzor said four air bombs were dismantled in the first day of the plant's operation.

The Pochep facility is expected to scrap about 19 percent of Russia's stockpiles, which total 40,000 metric tons.

Russia signed the Chemical Weapons Convention banning the development, production, stockpiling, transfer, and use of chemical arms in 1993, and ratified it in 1997. The country has so far destroyed about half of its chemical weapons arsenal.

The country has allocated \$7.18 billion from the federal budget for the implementation of the program, and has previously built five chemical weapon destruction plants — in Gorny (Saratov Region), Kambarka (Republic of Udmurtia), Nizhny Novgorod, the Maradykovo complex (Kirov Region), and Siberia's Kurgan Region.

By 2016-2017, Russia aims to finish all the remaining work under the project, including decontamination and equipment dismantlement.

Source: <http://www.globalsecurity.org/wmd/library/news/russia/2010/russia-101128-rianovosti03.htm>

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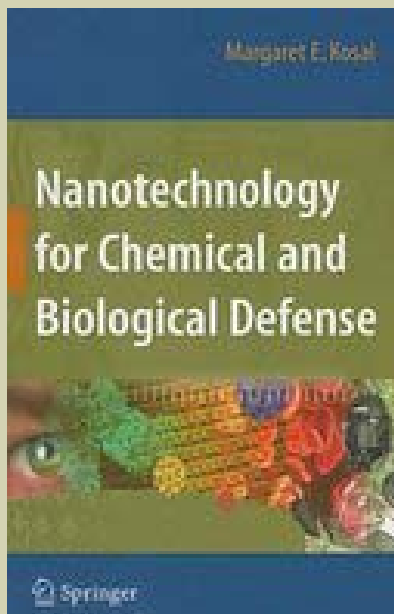
***Nanotechnology for
Chemical and
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Summary

The book titled "Nanotechnology for Chemical and Biological Defense" by Margaret E. Kosal offers many insights into various transformational breakthroughs in regard to chemical and biological countermeasures developed with the help of nanoscience and nanotechnology.



Nanotechnology is rapidly developing as a highly multidisciplinary discipline. It finds considerable interdisciplinary representation particularly with electronics, material science, sensor technology and medicine. The book titled "Nanotechnology for Chemical and Biological Defense" by Margaret E. Kosal offers many insights into various transformational breakthroughs regarding the chemical and biological countermeasures developed with the help of nanoscience and nanotechnology.

This 2010 Springer publication which links technology with the strategic thought is a well researched work and addresses various issues like detection, decontamination, protection and medical defence at the backdrop of using nanotechnology for the purposes for chemical and biological defence.

This 150 page document has got six main chapters. The first two chapters are more thematic in nature while the third and fourth chapters discuss actual technologies. Last two chapters are more prescriptive in nature and offer views on strategic research priorities, future challenges and emphasize the need for international collaboration in this area.

The author argues that in current era where the nature of warfare is rapidly changing, it is important for the defence leadership to take the note of revolution in technology taking place at the nano scale. Before getting into the details in regard to the usage of this technology for defence against chemical and biological weapons, the author highlights the relationship between science and national security and underlines that it is important to invest into new technologies from defence point of view even though at times the returns are not guaranteed. The second chapter attempts to address the potential for nanotechnology for defence against chemical

and biological weapons. For this purpose scenario building exercise has been used to know about the utility of this technology for the future. Under a special workshop, four scenarios for 2030 were developed which are discussed in the book.

Various current and futuristic technologies for the detection and diagnostics of the chemical and biological agents are discussed. Various mechanisms like pint detection and remote detection are found discussed without using much of a technical jargon. The most interesting aspect of this book is that all future technologies are being discussed at the backdrop of four scenarios' developed for the 2030 timeline. This approach allows the author to think in a structured fashion for development of a technology roadmap for the future carting for both best and worst-case possibilities.

Specific strategic research priorities have been identified to achieve effective countermeasures by 2030. The book also emphasises that there is a need to engage at the international level in regard to research and development in the field of nanotechnology. Overall this is an interesting read on a technical subject. The author has succeeded in making the complicated subject lucid and novelty of developing a book based on simulation exercise and scenario building method puts it in a must read category.



New Publication Shows that Transparency on Bioweapons Issues is Possible

(Geneva) The BioWeapons Prevention Project (BWPP) released the first edition of its BioWeapons Monitor during a seminar at the UN Office in Geneva (room XXIII, Building E, Palais des Nations) on 10 December 2010. This is modeled after the Landmine Monitor, the BioWeapons Monitor is an initiative to help monitor compliance with the international ban on biological weapons, established chiefly in the 1972 Biological Weapons Convention (BWC). The BWC still suffers from a lack of formal compliance assurance and verification mechanisms.

This first edition of the BioWeapons Monitor contains reports on four states drawn from four different continents that are biotech leaders in their geographical regions: Brazil, Germany, India and Kenya.

This document provides country reports on capabilities that could be misused for the development and production of biological weapons such as biodefence activities, biological high containment facilities and vaccine production capabilities. It also discusses life science and biotech industry activities and states' policies regarding biological weapons.

The BioWeapons Prevention Project (BWPP) is a global network of civil society actors dedicated to the permanent elimination of biological weapons and of the possibility of their re-emergence.

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