

# Chemical and Biological Weapons

## Chapter 1. Chemical Weapons Convention (CWC)

Section 1. Overview

Section 2. Organization for the Prohibition of Chemical Weapons (OPCW)

Section 3. Abandoned Chemical Weapons in China

Section 4. Destruction of old chemical weapons of the former Japanese army in Japan

## Chapter 2. Biological Weapons Convention (BWC)

The use of chemical and biological weapons has a relatively long history. With the development of science and industry, study and research on poisonous chemical and biological agents advanced, which also enabled study and development of their use in warfare.

The first large-scale use of chemical weapons occurred during the First World War: more than 1.3 million victims were injured or killed, 100,000 of which were killed due to chemical weapons. The possession and development of chemical weapons continued in the hands of some countries even after the war, but the horrendous effect of these weapons was widely recognized by the international community, and the Protocol for the Prohibition of the use in war of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare (hereinafter referred to as the Geneva Protocol concerning the Use of Prohibited Gases) was signed in 1925 as the first international convention to control chemical and biological weapons. While the use of these chemical and biological weapons in warfare was prohibited by the Geneva Protocol concerning the Use of Prohibited Gases, the ban of the production and possession of these weapons in peacetime were not stipulated in this protocol.

A resolution to condemn the use of chemical and biological weapons was adopted at the 21st UN General Assembly in 1966 and a report was submitted by the UN Secretary-General U Thant, entitled "Chemical and Bacteriological Weapons and the Impact of the Use Thereof" in 1969. Such movements led to active discussions about the importance of banning these weapons at the Committee on Disarmament and the United Nations. As a result, international efforts were focused on establishing an international convention for the control of production and possession of these weapons in peacetime. The convention was originally aimed at prohibiting both chemical and biological weapons. However, eventually the convention on the prohibition of biological weapons was drafted first for the reason that this was considered relatively simple, and the convention on the prohibition of chemical weapons came after. As a result, the Biological Weapons Convention (BWC) entered into force in 1975, and the Chemical Weapons Convention (CWC) entered into force in 1997.

# Chapter 1. Chemical Weapons Convention (CWC)

## Section 1. Overview

### 1. Background and overview of the CWC

The discussions on chemical weapons took place at the Commission of Disarmament during the 1970s. An Ad Hoc Committee for the Disarmament of Chemical Weapons was established under the Committee on Disarmament in the 1980s (renamed as the Geneva Conference on Disarmament in 1984) and full-fledged negotiations to ban chemical weapons commenced in 1984. The negotiations for the prohibition of chemical weapons gained momentum for early conclusion, owing to the use of chemical weapons during the Iran-Iraq War and to the start of the Gulf War. The draft of the Chemical Weapons Convention (CWC) was adopted at the Conference on Disarmament in 1992. The Treaty was then opened for signature in 1993 and entered into force in April 1997.

The CWC comprehensively prohibits the development, production and stockpiling of chemical weapons, such as sarin, and also obliges States Parties such as the US and Russia, which possess chemical weapons, to destroy all of their chemical weapons within a fixed period of time (in principle, within 10 years after entry-into-force of the CWC, i.e. by April 2007). This Convention is the first convention which not only completely bans an entire category of weapons of mass destruction and obliges its destruction, but also provides an effective verification system as a means to ensure compliance with the obligations of the Convention, thus it has a great significance in the history of disarmament treaties. States Parties are required to accept inspections by the Organization for the Prohibition of Chemical Weapons (OPCW-See Section 2 below) for not only chemical weapons (including old chemical weapons produced before 1946 which can no longer be used as chemical weapons) or those directly related to chemical weapons, such as chemical weapons production facilities (present and past), but also private plants and research institutions that are using chemicals for peaceful purposes (many of which are convertible to chemical weapons) .

### 2. Ratification of the CWC by Japan

Japan ratified the Chemical Weapons Convention as the 38th State Party in September 1995. Prior to the ratification of the CWC, Japan enacted the “Act on Prohibition of Chemical Weapons and Control, etc. of Specific Chemicals (Chemical Weapons Prohibition Act)” and has prohibited the use, production and transfer of chemical weapons by penal provisions in order to ensure its compliance with the CWC. Regarding chemicals that can be used for chemical weapons, the obligation to obtain permission from the Minister of Economy, Trade and Industry has been placed by this Act. In December 2001, prior to the conclusion of the “International Convention for the Suppression of Terrorist Bombings,” the above Chemical Weapons Prohibition Act was amended to include the offense of exhaling toxic substances or substances with equivalent toxicity. This Act also covers crimes outside Japan, as subject of punishment. The sarin gas attacks on the Tokyo Subway in March 1995 raised awareness of the threat of chemical weapons, which stimulated Japan for the early ratification of the Convention.

Japan, the world's leading chemical industrial country, submitted initial declarations on its chemical industry-related facilities to the OPCW at the time of the entry-into-force of the CWC in April 1997, and also submits annual declarations of about 500 facilities to the OPCW every year. The OPCW dispatches inspection teams to the declared facilities. Japan has already accepted 64 inspections as of the end of 2004 and all the inspections were completed without any problem. "Satian No.7" (Note: facility of the Aum Shinrikyo sect), which had been a plant to produce sarin that was used for the sarin gas attacks on the Tokyo Subway in March 1995, was declared to the OPCW by the Japanese Government as a chemical weapons production facility in the initial declaration after the entry-into-force of the CWC. The facility was destroyed in December 1998 under the strict supervision of inspectors dispatched from the OPCW.

### **3. Issues of the CWC and efforts of the international community**

The number of States Parties to the Convention reached 176 (as of February 2006, including non-member states of the UN), indicating an increased universality. However, North Korea and some Middle Eastern nations have yet to adhere to the Convention. So the major task is to encourage them to adhere to the Convention and to further promote the universality. At the same time, it is essential for States Parties to ensure full implementation of CWC obligations within their territories. Approximately only 60% of the State Parties have enacted national legislation for the implementation of CWC obligations and prohibited the use and development of chemical weapons by penal legislation. Enactment of national legislation in many developing countries remains yet to be completed. This might be caused by the fact that less priority has been given to the national implementation of the CWC in those countries, since they have neither the intention nor capability to be armed with chemical weapons.

However, as the use of chemical weapons by terrorist groups or non-state actors has become an imminent threat, promotion of the universality of the CWC and strengthening of national implementation measures are a task of paramount importance for the international security. This is because a terrorist group could attempt to develop or acquire chemical weapons in a State not Party to the CWC or a State Party whose national legislation has not yet been enacted to fulfill the obligations of the CWC. At the OPCW, therefore, the universality and strengthening of national implementation measures have been discussed as major themes. The importance of these issues was stressed at the First CWC Review Conference in April 2003, which led to the formulation of the Action Plan for the Universality of the Chemical Weapons Convention and the Plan of Action Regarding the Implementation of Article VII Obligations (National Implementation), and they have become the most important activities of the recent CWC.

Under such circumstances, Libya acceded to the CWC in January 2004 and started procedures for dismantling of its chemical weapons (approximately 23 tons of mustard agent) and chemical weapons production facilities. While this meant a great success in the chemical disarmament, the destruction of chemical weapons possessed by the US and Russia were delaying, and the Eighth Session of the Conference of the States Parties approved, respectively, the extension of the final deadline for destruction of chemical weapons in both States Parties beyond 2007. In October 2003, the First Regional Meeting of National Authorities of States Parties in Asia was held in Singapore to promote implementation of national obligations under the CWC, followed by the meetings in China (September 2004) and Iran (September 2005). Participating

States Parties, including Japan, actively exchanged opinions about their experiences with national implementation of the CWC.

#### 4. Japan's efforts

Japan actively participates in the efforts of the international community, and also harnesses its own approaches to States not Party to the Convention and provides support in particular within the Asian Region. Japan hosted the Seminar for ASEAN Members for the Universality of the CWC (March 2002, in Tokyo and Kyoto) and the Seminar on Prevention and Crisis Management on Chemical Terrorism (July 2004, in Malaysia). At the Second Regional Meeting of National Authorities of States Parties in Asia, Japan called for an early accession to the CWC by the States not Party in the region and encouraged other States Parties to strengthen their national implementation by sharing with participants Japan's experience in the national implementation of the CWC and information on how Japan's implementation system has been developed. Japan's cooperation includes the acceptance of trainees from developing countries at chemical industry-related facilities in Japan (August - September 2004) and financial support for the CWC-related training for Iraq (July 2005).

##### **(Reference) Types of Chemical Weapons and Situation of Destruction**

Chemical weapons are relatively easily produced in laboratories or chemical factories, etc. Toxic chemicals that have been developed as chemical weapons thus far are roughly divided into blood agents, such as cyanogen chloride, which inhibit the intake of oxygen into the blood and thereby cause the loss of body function, an asphyxiant called phosgene, which damages bronchi and lungs and thereby causes choking, blister agents such as mustard, which cause serious inflammation of the skin and the respiratory system, and nerve agents such as sarin, which inhibit neuro transmission and thereby cause muscle fasciculation and breathing problems, among which nerve agents have the highest lethality. According to the Technical Secretariat of the OPCW, States Parties have declared to the Technical Secretariat of the OPCW a total of approximately 71,000 tons of chemical weapons, among which approximately 11,000 tons had been destroyed by the end of June 2005. (However, these figures do not include those possessed by States not Party to the Convention.)

## **Section 2. Organization for the Prohibition of Chemical Weapons (OPCW)**

The Organization for the Prohibition of Chemical Weapons was established, with the main objective to verify the implementation of the CWC, in the Hague, the Netherlands in May 1997. More than 1,900 on-site inspections have been carried out during the seven and a half years since its foundation. The inspections are mainly composed of on-site inspections of storage and destruction facilities of chemical weapons declared by the possessor states such as the US and Russia and on-site inspections of facilities that deal with specific chemicals and that have been declared to the OPCW by the State Parties with chemical industries (including Japan). The latter is commonly called "industrial inspection" and its objective is to confirm the absence or presence of clandestine devel-

opment or production of chemical weapons under the disguise of the chemical industry. States Parties to the Convention have the right to request a challenge inspection, which is conducted to clarify non-compliance concerns at any facilities or locations of any other State Party to the Convention. When the request for a challenge inspection is made, the inspection is conducted at the facility or location concerned, unless three quarters of the Executive Council members vote against the inspection within 12 hours after the request was received. The challenge inspection is groundbreaking in terms of allowing inspections at non-declared facilities or locations, but it has never been requested since the entry-into-force of the CWC.

The OPCW actively promotes cooperation among the States Parties by organizing seminars and training courses concerning universality, national implementation support and protection against chemical weapons, and so on.

The OPCW is composed of the Conference of the States Parties, which is the general assembly of the States Parties that is convened annually, the Executive Council which is composed of 41 representative States Parties (including Japan) from each regional group and are usually convened four times a year, and the Technical Secretariat. The Technical Secretariat comprises about 500 officials, of which about 190 are inspectors engaged in verification activities. Japan is the second largest contributor to the OPCW budget after the United States.

Japan invited Director-General Rogelio Pfirter as an official guest of the Ministry of Foreign Affairs in 2003. During his visit, Mr. Pfirter had talks with then Foreign Minister Yoriko Kawaguchi and delivered a lecture at the symposium at the United Nations University entitled, “Towards the Elimination of the Chemical Weapons – Roles of the OPCW and Japan” (co-hosted by the Ministry of Foreign Affairs and the United Nations University). Japan also invited OPCW Deputy Director-General, Mr. Brian Hawtin, in October 2004. Mr. Hawtin met with Mr. Katsuyuki Kawai, then Parliamentary Secretary for Foreign Affairs and lectured at the Kyoto University, thereby contributing to the promotion of the understanding of the CWC and the OPCW in Japan.

### **Section 3. Abandoned Chemical Weapons in China**

The issue of abandoned chemical weapons (ACWs) in China is derived from the chemical weapons brought into China by the former Japanese army before the end of the Second World War. Both Japan and China are States Parties to the CWC, and Japan is obliged to destroy the ACWs left in China by the former Japanese army with the entry into-force of the CWC. The CWC stipulates that an Abandoning State Party shall provide all necessary financial, technical, expert and facility as well as other resources to destroy relevant ACWs and that a Territorial State Party shall provide appropriate cooperation. In May 1997, Japan together with China submitted to the OPCW a declaration on the ACWs in China based on the results of a number of joint on-site investigations. Inspection activities by the OPCW to confirm the contents of the submitted declaration have been conducted 14 times (at 22 places in total) up until present. The joint-on-site investigations, excavation and recovery by Japan and China are ongoing since most of the ACWs are thought to be still buried underground and there is a possibility that more ACWs are discovered. Approximately 37,000 abandoned chemical weapons have been excavated and recovered thus far.

In order to comprehensively deal with the destruction of the ACWs, the Government of Japan assigned, by a Cabinet decision of May 1999, the Prime Minister’s Office (renamed the Cabinet

Office after the reorganization of ministries and agencies in January 2001) to take charge of the destruction process of ACWs, and the ACW Office was set up in the Prime Minister's Office in April 1999.

The Governments of Japan and China came to a common understanding on the basic framework for the destruction of the ACWs and signed a memorandum (entitled the "Memorandum between the Government of Japan and the Government of the People's Republic of China on the Destruction of Abandoned Chemical Weapons in China") in July 1999.

In the Haerbaling District, Jilin Province, where the largest burial site of abandoned weapons is located, access roads and infrastructure have been under construction. In April 2004, Japan and China agreed on the location of destruction facility and the destruction technology (incineration) and are now preparing technical and organizational aspects for the construction of an excavation and recovery facility and a destruction facility. Experts from both countries are continuing discussions about various environment conservation measures. (With regard to the tentatively estimated number of buried weapons in the Haerbaling District, Japan had initially declared 674,000 munitions to the OPCW, the figure was later corrected to 300,000 - 400,000 munitions in December 2005, based on subsequent investigations).

Under such circumstances, an accident occurred in August 2003, in which 44 persons including construction workers were injured (one of whom died) due to the liquid leaked from the drums excavated at the construction site in Qiqihar, Heilongjiang Province. In the same month, Japan dispatched a fact-finding mission, a team in charge of temporarily sealing the drums that caused the accident, and a medical team to cooperate promptly in dealing with the accident and the Governments of Japan and China confirmed the final settlement of this matter on October 19 the same year.

In order to prevent another such tragedy, the Government of Japan intends to appropriately deal with the issue of Japanese ACWs and to destroy them as soon as possible in accordance with the Convention and in close cooperation with China.



Excavation and recovery work in Ningan (2004)

## Section 4. Destruction of old chemical weapons of the former Japanese army in Japan

### 1. Old chemical weapons at Lake Kussharo in Hokkaido

As a result of an investigation based on the information provided by a person related to the former Japanese army, 26 chemical weapons were found and salvaged from the lakebed of Lake Kussharo, and were subsequently sealed in a concrete container newly installed underground in the vicinity of the lake in October 1996.

The Government submitted the information on these chemical weapons to the OPCW as “old chemical weapons” as stipulated in the CWC in May 1997. An on-site inspection by the OPCW and destruction of those OWCs were conducted thereafter, and the inspection team from the OPCW confirmed the completion of the destruction process in November 2000.

### 2. Old chemical weapons in Okunojima Island, Hiroshima

Nine suspicious items, which were considered “Large Red Gas Canisters” manufactured by the former Japanese army, were discovered at the site of repair work for old-raid shelters on the south side of Okunojima Island, Takehara, Hiroshima, in March 1999. (The “Large Red Gas Canister” refers to a toxic smoke canister filled with sternutatory chemicals. The outer shells of all nine items were rusty and perforated with many holes while the contents were solidified.)

In September 2000, the Japanese government declared those items as “old chemical weapons” to the OPCW. Thereafter, these old chemical weapons were destroyed in December 2000 in the presence of the OPCW inspection team and the team confirmed the destruction.

### 3. Old chemical weapons found off Kanda Port, Fukuoka

In November 2000, 18 items suspected to be old bombs of the former Japanese army were found off Kanda Port, Miyako-gun, Fukuoka, during dredging of the port and harbor and were salvaged from the seabed.

In the same month, another lot of 38 similar bomb-like items was found near the spot, where the suspicious 18 items were discovered previously, and so was one more such item off Shin Moji Port near the discovery site in December the same year. These 39 suspicious items were sealed in a closed container and have been temporarily stored near the disposal site under water since July 2004.

Japan declared these 18 items to the OPCW as “old chemical weapons” in May 2001 and made a similar declaration on the 39 temporarily stored items in August 2004. Thereafter, an on-site inspection by the OPCW and destruction of these OWCs were conducted in October 2004.

In addition, 538 abnormally magnetic points were detected on the seabed as a result of high-precision magnetic searches in the sea area within Kanda Port where dredging was scheduled to be conducted during May-September 2003.

Japan declared these items to the OPCW as “old chemical weapons” in January 2005, and 538 items declared were destroyed during February-May 2005. Meanwhile, the OPCW conducted an on-site inspection in April 2005.

As a result of high-precision magnetic searches in the sea area within Kanda Port where dredging is scheduled to be conducted, 83 bomb-like items were detected and their disposal is currently under consideration.



Inspection by the OPCW inspection team at Kanda Port, Fukuoka Prefecture (2004)

#### **4. Old chemical weapons at the construction site of Sagami Expressway in Kanagawa**

In September 2002, several broken old beer bottles were found when digging at the construction site of “Sagami Jukan Expressway” (land after the Sagami Naval Factory of the former Japanese navy) in Samukawa-cho, Kouza-gun, Kanagawa, and a strange odor was confirmed at the same time. Afterwards, some construction workers showed symptoms such as rashes and blisters. The content of the 11 suspicious beer bottles was analyzed by the Defense Agency. As a result, the main components were found to be mustard, lewisite (blister agents) and chloroacetophenone (tear gas). By the end of March 2004, a drilling study on the construction site was conducted and drilled soil (contaminated soil) and beer bottles were separated; as a result, a total of 791 bottles (not including the 11 bottles mentioned above) were found. In addition, four other suspicious bottles were found in the process of detoxification of the drilled soil (contaminated soil), which commenced at the detoxification facility in April 2004.

In December 2002, Japan declared to the OPCW that the mustard and lewisite found in the relevant bottles were “old chemical weapons.” Subsequently, Japan also declared to the OPCW the relevant beer bottles pertinent to “old chemical weapons,” which were found after December 2002 as appropriate. Destruction of the removed beer bottles was conducted during May-August 2004 and the destruction record was submitted to the OPCW as well.

Detoxification of drilled soil (contaminated soil) and beer bottles from the construction site commenced in April 2004, and was completed in October 2004.

#### **5. Suspicious objects in Hiratsuka-shi, Kanagawa**

In April 2004, three spherical glass bottles (about 8cm in diameter) were found while drilling at the construction site of the “Hiratsuka national Government Building No.2” (land after the Sagami Naval Factory of the former Japanese navy) in Hiratsuka-shi, Kanagawa, and three workers were taken to a hospital with complaints of headaches. The NBC riot police of Kanagawa

Prefecture investigated the area surrounding the construction site, but no chemicals were detected. A total of 30 glass bottles were found afterwards as a result of an underground exploration at the construction site and hydrogen cyanide (prussic acid) was detected in some of them.

In December 2003, Japan submitted a declaration on these bottles as OCWs to the OPCW. The destruction of these objects was completed by the end of March 2004.

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## Chapter 2. Biological Weapons Convention (BWC)

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### 1. History of the Biological Weapons Convention (BWC)

Biological weapons were firstly prohibited by the Geneva Protocol concerning Use of Prohibited Gases which banned the use of any chemical and biological weapons in wartime. Several attempts were made to comprehensively prohibit the use of chemical and biological weapons in peacetime; however, it was eventually decided to first start with a convention to prohibit biological weapons, which is easier to reach consensus (See the opening of Part IV for details). Thus the Biological Weapons Convention (formerly entitled “Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction”) was formulated. The Convention was opened for signature on April 10, 1972, and entered into force on March 26, 1975. The number of States Parties to the Convention is 155, and that of Signatories is 16 as of February 2006.

### 2. Ratification of BWC by Japan

Japan ratified the BWC on June 8, 1982. Prior to this, Japan enacted the Law on Implementing the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction (BWC Implementing Law) to prohibit production, possession, transfer and acquisition of biological and toxin weapons by penal provisions. Before concluding the International Convention for the Suppression of Terrorist Bombings, Japan amended the BWC Implementing Law in December 2001 to prohibit the use of biological and toxin weapons and the discharge of biological agents and toxins, both of which also cover offenses committed outside Japan.

### 3. Efforts for strengthening of the BWC

The Convention comprehensively prohibits the development, production, stockpiling, and possession of biological weapons in war and in peace. However, unlike the CWC, the BWC does not contain effective mechanisms for verifying that States Parties are complying with the provisions of the Convention. Therefore, the need for such measures has long been evident.

At the Third Review Conference (1991, convened every five years), a Group of Governmental Experts was established to consider the means to strengthen the Convention. And at the Special Conference of States Parties to the BWC (1994), convened in response to its report, it was then decided to negotiate the setting up of an “appropriate measures, including possible verification measures” (BWC Verification Protocol) with an aim for the formulation of a protocol to introduce the means of verification. However, negotiations were stalled. In contrast to chemical weapons, it would be very difficult to verify compliance since biological agents are much easier to propagate and to be sterilized in destroying relevant evidences. At the Fifth Review Conference convened in November 2001, no consensus was reached amongst the States Parties and eventually the negotiations on the Verification Protocol were “halted”.

On the other hand, as evidenced from a series of reports of the UNSCOM/UNMOVIC that Iraq had a sophisticated offensive biological weapons program since before the pre-Gulf War

era, and possessed biological agents such as botulinum toxin and anthrax, research and development on biological weapons at a national level remained a threat to international peace. In recent years, the international community has become increasingly aware of terrorist activities using dangerous biological agents (bioterrorism) as real and imminent danger, in the wake of the development of botulinum toxin and anthrax by the Aum Shinrikyo in 1995 and the anthrax scare in the US in 2001.

In such a heightened sense of crisis, the Fifth Review Conference was resumed in November 2002, and a three-year program of work to strengthen the Convention was adopted by consensus. In view of the next (sixth) Review Conference in 2006, it was decided that State Parties would hold annually the Meeting of States Parties and preparatory Meetings of Experts in Geneva to discuss and promote common understanding and effective action on, in a sequential manner, the following five areas for strengthening the Convention.

**[Five areas for strengthening the Convention]**

- i. the adoption of necessary national measures to implement the prohibitions set forth in the Convention, including the enactment of penal legislation;
- ii. national mechanisms to establish and maintain the security and oversight of pathogenic microorganisms and toxins;
- iii. enhancing international capabilities for responding to, investigating and mitigating the effects of cases of alleged use of biological or toxin weapons or suspicious outbreaks of disease;
- iv. strengthening and broadening national and international institutional efforts and existing mechanisms for the surveillance, detection, diagnosis and combating of infectious diseases affecting humans, animals, and plants;
- v. the content, promulgation, and adoption of codes of conduct for scientists.

In both 2003 (agenda i. and ii. of the above) and 2004 (agenda iii. and iv. of the above), based on information and opinion exchange at the Meetings of Experts, priority issues of the relevant agenda for the year and important measures for strengthening implementation were identified and a report calling for the provision of information of any actions, measures or other steps that States Parties have taken to the next Review Conference (2006) was adopted by consensus at the Meetings of States Parties.

In 2005, the last year of the three-year program of work, meeting of States Parties was convened in response to the preceding Meeting of Experts held in June. In 2006, the Sixth Review Conference is scheduled to discuss possible measures for further strengthening the BCW, including assessment and follow-up of the previous three-year program of work.

#### **4. Japan's efforts**

In response to the suspension of the negotiations of the Verification Protocol to the BCW, Japan hosted the BWC Tokyo Seminar in July 2002. Through discussions involving experts on the future measures for strengthening the BWC, Japan actively contributed to the discussions at the fifth Review Conference. More recently, Japan held the Training Course on Prevention and Crisis Management on Biological Terrorism to share knowledge with Asian nations about

assessment of terrorist-related threats by experts from Japan, US, France and WHO, security control of biological agents, surveillance, and appropriate measures for responding to biological terrorist incidents, etc. In this way, Japan contributes to regional enhancement of response capabilities against bioterrorism.

**(Reference)**

Biological weapons refer to weapons intended to attack humans, animals and plants by using biological agents such as the small pox virus, cholera bacteria, anthrax, and botulinum toxin or other organisms that possess or transmit such agents. The characteristics of biological weapons are the following:

- 1) it is difficult to distinguish whether an outbreak of infectious disease is natural or deliberate;
- 2) once used, the effects of BW can spread widely and persist for an extended period due to the infectious nature of some agents;
- 3) the ease of propagation enables mass production of BW and easy to propagate, mass productions; and
- 4) it is difficult to locate the site of development and production because the evidence of production is easily destroyed by disinfectant.