



Homeland Security Information Bulletin
Chemical, Biological, Radiological and Nuclear (CBRN) Materials and
Effects
May 28, 2003

This Bulletin is being disseminated for information purposes only. Al-Qaeda and sympathetic terrorists groups continue to demonstrate their interest in mass-casualty attacks using chemical, biological, radiological, and nuclear (CBRN) weapons. Although we possess no specific information indicating that Al-Qaeda or other groups are currently planning a CBRN attack in the United States, such an attack cannot be ruled out. This bulletin does not contain threat warning information. The following information summarizes a recent FBI Bulletin on typical agents and CBRN devices available to Al-Qaeda and other terrorist groups.

Chemical Agents

Terrorists have considered a wide range of toxic chemicals for attacks. Typical plots focus on poisoning foods or spreading the agent on surfaces to poison via skin contact, but some also include broader dissemination techniques.

Terrorists have considered using a number of toxic cyanide compounds. Sodium or potassium cyanides are white-to-pale yellow salts that can be easily used to poison food or drinks. Cyanide salts can be disseminated as a contact poison when mixed with chemicals that enhance skin penetration, but may be easily detected since victims will notice touching wet or greasy surfaces.

Hydrogen cyanide (HCN) and cyanogen chloride (CICN) are colorless-to-pale yellow liquids that turn into a gas near room temperature. HCN may or may not have an odor of bitter almonds, and CICN has an acrid choking odor and causes burning pain in the victim's eyes. Although these signs may provide warning to enable evacuation or ventilation of the attack site before the agent reaches a lethal concentration, no one should rely on their senses alone to determine the potential risk for exposure. Both HCN and CICN must be released at a high concentration to be effective; therefore, leaving or ventilating the area can reduce the agents' lethality.

Exposure to cyanides may produce nausea, vomiting, palpitations, confusion, hyperventilation, anxiety, and vertigo that may progress to agitation, stupor, coma, and death. At high doses, cyanides cause immediate collapse. Medical treatments must be administered immediately for severely exposed victims.

Mustard gas is a blister agent that poses a contact and vapor hazard. Its color ranges from clear to dark brown depending on purity, and it emits a characteristic garlic-like odor. Mustard is a viscous (gelatinous) liquid at room temperature; it converts to a gas as the temperature increases. Initial skin contact causes mild skin irritation, which develops into more severe yellow fluid-filled blisters. Inhalation of mustard damages the lungs, causes breathing difficulties, and death by suffocation in severe cases due to water in the lungs. Symptoms appear within 2 to 24 hours. Medical treatments are available for victims of mustard-agent poisoning.

Sarin, tabun, and VX are highly toxic agents that disrupt a victim's nervous system by blocking the transmission of nerve signals. Exposure to nerve agents causes constriction of the pupils, salivation, and convulsions that can lead to death. Medical treatments must be administered immediately for severely exposed victims.

While not as toxic as cyanide, mustard, or nerve agents, a wide range of toxic industrial chemicals can be used in much larger quantities to compensate for their lower toxicity. For example, chlorine is an industrial chemical that is transported in shipments by road and rail. Rupturing the container can easily disseminate the gas. The effects of chlorine are similar to those of mustard. Organophosphate pesticides such as parathion are in the same chemical class as nerve agents. Although these pesticides are much less toxic, their effects and medical treatments are the same as for military-grade nerve agents.

Biological Agents

Bacillus anthracis, the bacterium that causes anthrax, is an attractive biological threat agent because it forms spores which are resistant to harsh environmental conditions. Symptoms usually appear within one to six days after exposure and include fever, malaise, fatigue, and shortness of breath. Inhalation anthrax is usually fatal unless antibiotic treatment is started prior to the onset of symptoms; however, it is not contagious. Anthrax can be disseminated in an aerosol or used to contaminate food or water to cause inhalational or ingestional anthrax, respectively. Cutaneous anthrax can be caused by skin contact with *B. anthracis*. This form of the disease, which is easily treated with antibiotics, is rarely fatal.

Botulinum toxin is produced by the bacterium *Clostridium botulinum*, which occurs naturally in the soil. Crude but viable methods to produce small quantities of this lethal toxin have been found in terrorist training manuals. Symptoms usually occur 24 to 36 hours after exposure, but onset of illness may take several days if the toxin is present in low doses. Symptoms include vomiting, abdominal pain, muscular weakness, and visual disturbance. Botulinum toxin would be effective in small-scale poisonings or aerosol attacks in enclosed spaces. The toxin molecule is likely too large to penetrate intact skin.

Ricin is a plant toxin that is 30 times more potent than the nerve agent VX by weight and is readily obtainable by extraction from common castor beans. There is no treatment for ricin poisoning after it has entered the bloodstream. Victims start to show symptoms within hours to days after exposure, depending on the dosage and route of administration.

Terrorist have looked at delivering ricin in foods and as a contact poison, although there is no scientific data indicating that ricin can penetrate intact skin. Ricin will remain stable in foods as long as they are not heated, and it will have few indicators because it does not have a strong taste and is off-white in color.

Radiological and Nuclear Devices

A radiological dispersal device (RDD) is designed to disperse radioactive material to cause contamination from the radioactive material. An RDD can be almost any size, defined only by the amount of radioactive material and explosives.

-- A passive RDD is a system in which unshielded radioactive material is dispersed or placed manually at the target.

-- An explosive RDD--often called a "dirty bomb"--is any device that uses the explosive force of detonation to disperse radioactive material.

-- An atmospheric RDD is any system in which radioactive material is dispersed into a form that is easily transported by air currents.

Use of an RDD by terrorists could result in health, environmental, and economic effects as well as political and social effects. While unlikely to cause mass casualties or extensive destruction, it will cause fear, injury, and possibly lead to levels of contamination requiring costly and time-consuming cleanup efforts.

A variety of radioactive materials are commonly available and could be used in a RDD, including Cesium-137, Strontium-90, and Cobalt-60. Hospitals, universities, factories, construction companies, and laboratories are possible sources for these radioactive materials.

An improvised nuclear device (IND) is intended to cause a yield-producing nuclear explosion. An IND could consist of diverted nuclear weapon components, a modified nuclear weapon, or indigenous-designed device.

INDs can be categorized into two types: implosion and gun assembled. Unlike RDDs that can be made with almost any radioactive material, INDs require fissile material--highly enriched uranium or plutonium--to produce nuclear yield.

More detailed information on the medical aspects of chemical, biological, and nuclear weapons threats can be found at the following Internet site: CIA, CBR Incident Handbook www.cia.gov/CIA/Publications/cbr-handbook/cbrbook.html.

Information related to suspicious activities potentially related to terrorist use of CBRN should be forwarded immediately to the nearest Joint Terrorism Task Force.

DHS encourages individuals to report information regarding suspicious or criminal activity to law enforcement or a Homeland Security watch office. Individuals may report incidents online at <http://www.nipc.gov/incident/cirr.htm>. Federal agencies/departments may report incidents online at <http://www.fedcirc.gov/reportform.html>. Contact numbers for the IAIP watch centers are: for private citizens and companies, (202) 323-3205, 1-888-585-9078 or nipc.watch@fbi.gov; for the telecom industry, (703) 607-4950 or ncs@ncs.gov; and for Federal agencies/departments, (888) 282-0870 or fedcirc@fedcirc.gov.