

CRIMINAL OR TERRORIST USE OF CHEMICAL, BIOLOGICAL AND RADIOLOGICAL AGENTS

If you suspect an intentional release of a chemical, biological or radiological agent (CBRN), you should immediately contact your local emergency response authorities (911). Additionally, for CBRN incidents occurring:

- within the United States, call the National Response Center at 1-800-424-8802
- within Canada, call CANUTEC at 613-996-6666 (1-888-226-8832)
- within Mexico, call CENACOM at 555128-0000 extensions 36428, 36422, 36469, 37807, 37810
- in other countries, consult the “24-hour emergency response telephone numbers” section.”

The following is general guidance and does not serve as specialized incident response training. Do not enter the scene without appropriate training and equipment.

Initial actions to consider in a potential CBRN/terrorism event:

- First responders must ensure their own safety.
- Avoid using cell phones, radios, etc. within 100 meters (300 feet) of a suspect device.
- If known, request trained specialist resources.
- Set up incident command upwind and uphill of the area.
- Do **not** touch or move suspicious packages or containers.
- Be cautious about the potential presence of secondary devices (e.g., improvised explosive devices (IEDs)).
- Avoid contamination.
- Limit access to only those responsible for rescue of victims or assessment of unknown materials or devices.
- Evacuate and isolate people who were potentially exposed to hazardous materials/ dangerous goods to an area away from the scene, preferably upwind and uphill while avoiding physical contact to the extent possible.
- Isolate contaminated areas and secure the scene for analysis of material.

First responders can use the following information to make an initial assessment of a situation they suspect involves criminal or terrorist use of chemical agents, biological agents and/or radioactive materials (CBRN). To help with this, the following paragraphs have a list of observable indicators that a CB agent or radioactive material has been used or is present. This section ends with a Safe Stand-Off Distance Chart for various threats when improvised explosive devices (IEDs) are involved.

DIFFERENCES BETWEEN A CHEMICAL, BIOLOGICAL AND RADIOLOGICAL AGENT

Chemical and biological agents as well as radioactive materials can be dispersed in the air we breathe, the water we drink, or on surfaces we physically contact. Dispersion methods may be as simple as opening a container or using conventional (garden) spray devices, or as elaborate as detonating an improvised explosive device.

Chemical incidents are characterized by the rapid onset of medical symptoms (in minutes to hours) and easily observed signatures (colored residue, dead foliage, pungent odor, dead insects and animals).

Biological incidents are characterized by the onset of symptoms in hours to days. Typically, there will be no characteristic signatures because biological agents are usually odorless and colorless. Because of the delayed onset of symptoms, the affected area may be greater due to the movement of infected people.

Radiological incidents are characterized by the onset of symptoms, if any, in days to weeks or longer. Typically, there will be no characteristic signatures because radioactive materials are usually odorless and colorless. Specialized equipment is needed to determine the size of the affected area, and if the level of radioactivity is an immediate or long-term health hazard. Because it is impossible to detect radioactivity without special equipment, the affected area may be greater due to the migration of contaminated people.

The most probable sources would not generate enough radiation to kill people or cause severe illness. In a radiological incident generated by a "dirty bomb," or radiological dispersal device (RDD), in which a conventional explosive is detonated to spread radioactive contamination, the primary hazard is from the explosion. However, certain radioactive materials dispersed in the air could contaminate up to several city blocks, creating fear and possibly panic, and needing potentially costly cleanup.

INDICATORS OF A POSSIBLE CHEMICAL INCIDENT

Dead animals/birds/fish	Not just an occasional road kill, but numerous animals (wild and domestic, small and large), birds, and fish in the same area.
Lack of insect life	If normal insect activity (ground, air, and/or water) is missing, check the ground, water surface or shore line for dead insects. If near water, check for dead fish and/or aquatic birds.
Unexplained odors	Possible odors include fruity, flowery, sharp, pungent, garlic, horseradish-like, bitter almonds, peach kernels, or newly mown hay. The odor is completely out of character with its surroundings.
Unusual numbers of dying or sick people (mass casualties)	Health problems including nausea, disorientation, difficulty in breathing, convulsions, localized sweating, conjunctivitis (reddening of eyes), erythema (reddening of skin) and death.
Pattern of casualties	Casualties will likely be distributed downwind, or if indoors, by the air ventilation system.

Blisters or rashes	Numerous people experiencing unexplained water-like blisters, weals (like bee stings), and/or rashes.
Illness in confined area	Different casualty rates for people working indoors versus outdoors dependent on where the agent was released.
Unusual liquid droplets	Numerous surfaces show oily droplets or film; numerous water surfaces have an oily film (no recent rain).
Different-looking areas	Not just a patch of dead weeds, but trees, shrubs, bushes, food crops, and/or lawns that are dead, discolored, or withered (no current drought).
Low-lying clouds	Low-lying cloud or fog-like condition not consistent with its surroundings.
Unusual metal debris	Unexplained bomb or munitions-like material, especially if it contains a liquid.

INDICATORS OF A POSSIBLE BIOLOGICAL INCIDENT

Unusual numbers of sick or dying people or animals	Any number of symptoms may occur. Casualties may occur hours to days after an incident has occurred. The time required before symptoms are observed is dependent on the agent.
Unscheduled and unusual spray being disseminated	Especially if outdoors during periods of darkness.
Abandoned spray devices	Devices may not have distinct odors.

INDICATORS OF A POSSIBLE RADIOLOGICAL INCIDENT

Radiation Symbols	Containers may display a “propeller” radiation symbol.
Unusual metal debris	Unexplained bomb or munitions-like material.
Heat-emitting material	Material that is hot or seems to emit heat without any sign of an external heat source.
Glowing material	Strongly radioactive material may emit or cause radioluminescence.
Sick people/animals	In very improbable scenarios there may be unusual numbers of sick or dying people or animals. Casualties may occur hours to days or weeks after an incident has occurred. The time required before symptoms are observed is dependent on the radioactive material used, and the dose received. Possible symptoms include skin reddening or vomiting.

PERSONAL SAFETY CONSIDERATIONS

When you approach a scene that may involve CB agents or radioactive materials, the most critical thing to consider is your safety and that of other responders.

Use protective clothing and respiratory protection of an appropriate level of safety. In incidents where you suspect that CBRN materials have been used as weapons, NIOSH-certified respirators with CBRN protection are highly recommended. Be aware that you may not be able to verify or identify CB agents or radioactive materials, especially in the case of biological or radiological agents.

The following actions apply to a chemical, biological or radiological incident. This guidance is general. Responders will need to apply it on a case-by-case basis.

Approach and response strategies:

- Minimize exposure time.
- Maximize the distance between you and the item that is likely to harm you.
- Use cover as protection.
- Wear appropriate personal protective equipment and respiratory protection.
- Identify and estimate the hazard by using the indicators above.
- Isolate the area and secure the scene.
- Isolate and decontaminate potentially contaminated people as soon as possible.
- To the extent possible, take measures to limit the spread of contamination.

In the event of a **chemical** incident, the fading of chemical odors does not necessarily indicate reduced vapor concentrations. Some chemicals deaden the senses, giving you the false perception that the chemical is no longer present.

If there is any indication that an area may be contaminated with **radioactive** materials, including the site of any non-accidental explosion, responders:

- should be equipped with radiation detection equipment
- should have adequate training in how to use this equipment

This equipment should be designed to also alert responders when an unacceptable ambient dose rate or ambient dose has been reached.

DECONTAMINATION MEASURES

For chemical and biological agents: Emergency responders should follow standard decontamination procedures (flush-strip-flush). Mass casualty decontamination should begin as soon as possible by stripping all clothing, and flushing with soap and water. For further information, contact the agencies listed on the inside back cover of this guidebook.

For people contaminated with radioactive material: Take care to minimize the spread of the contamination to the extent possible. Move them to a low radiation area if necessary, and if it can be done safely. Remove their clothing and place it in a clearly marked and sealed receptacle, such as a plastic bag, for later testing. Use decontamination methods described above, but avoid breaking the skin (e.g., vigorous brushing). External radiological contamination on intact skin rarely causes a high enough dose to be a hazard, to either the contaminated individual or the first responders. For this reason, prioritize medical stabilization for a contaminated injured individual.

NOTE: The above information was developed in part by the Department of National Defence (Canada), the U.S. Department of the Army, Aberdeen Proving Ground and the Federal Bureau of Investigation (FBI).

CHEMICAL AND BIOLOGICAL WARFARE AGENTS

Chemical and biological warfare agents do not have an assigned ID number because they are not commercially transported. In an emergency situation, the assigned guide (orange section) will provide guidance for the initial response.

The volumes used for the chemical warfare agents' distances are:

- Small release consists of a discharge up to 2 kg (4.4 lbs.)
- Large release consists of a discharge up to 25 kg (55 lbs.)

Biological Warfare Agents:

Biological agents	Pathogens (bacteria, viruses, etc.) that are dispersed with criminal intent. They can cause disease or death in otherwise healthy humans. Examples: Anthrax, plague, smallpox virus. Refer to GUIDE 158.
Toxins	Poisonous or toxic material from a plant, animal, or bacterial source. Examples: Botulinum toxin, ricin. Refer to GUIDE 152.

Chemical Warfare Agents:

Blister agents (vesicants)	Substances that cause blistering of the skin. Exposure is through liquid or vapor contact with any exposed tissue (eyes, skin, lungs). Examples: Lewisite, Mustard. Symptoms: Red eyes, skin irritation, burning of skin, blisters, upper respiratory damage, cough, hoarseness.
Blood agents	Substances that interfere with cell respiration (the exchange of oxygen and carbon dioxide between blood and tissues). Examples: Arsine, cyanogen chloride, hydrogen cyanide. Symptoms: Respiratory distress, headache, unresponsiveness, seizures, coma.
Choking agents	Substances that cause physical injury to the lungs. Exposure is through inhalation. In extreme cases, membranes swell, and lungs become filled with liquid (pulmonary edema). Death results from asphyxiation. Examples: Diphosgene, phosgene. Symptoms: Irritation to eyes, nose, and throat, respiratory distress, nausea, vomiting, burning of exposed skin.
Incapacitating agents	Materials that make people unable to think clearly or that cause an altered state of consciousness (possibly unconsciousness). Examples: 3-Quinuclidinyl benzilate (Buzz). Symptoms: Hallucinations, confusion, agitation, dilated pupils, blurred vision, dry/flushed skin, diarrhea, elevated heart rate, high blood pressure, elevated temperature.
Nerve agents	Substances that interfere with the central nervous system. Exposure is primarily through contact with the liquid (via skin and eyes) and secondarily through inhalation of the vapor. Examples: Sarin, Tabun, VX. Symptoms: Pinpoint pupils, extreme headache, severe tightness in the chest, dyspnea, runny nose, coughing, salivation, unresponsiveness, seizures.

Tear gas agents	Chemical compounds that temporarily make people unable to function by causing irritation to the eyes, mouth, throat, lungs, and skin. Examples: Bromobenzylcyanide, chloroacetophenone. Symptoms: Excessive tearing, burning eyes, blurred vision, redness of the eyes, burning and irritation to mouth, difficulty swallowing, chest tightness, coughing, choking sensation, skin burns and rash.
Vomiting agents	Chemicals that cause rapid onset of irritation of the eyes, upper airway, and skin, and also nausea and vomiting. Examples: Adamsite, diphenylchloroarsine. Symptoms: Irritation of the eyes, noses, burning in throat, chest tightness, nausea, vomiting, abdominal cramps.

INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

Chemical warfare agents	Guide	Initial isolation Meters (Feet)	Small release Kilometers (Miles)	Large release Kilometers (Miles)
Blister agents (vesicants)	153	200 (600)	0.4 (0.3)	1.6 (1.0)
Blood agents	117	400 (1200)	0.9 (0.6)	3.2 (2.0)
Choking agents	125	100 (300)	0.3 (0.2)	1.1 (0.7)
Incapacitating agents	153	1000 (3000)	1.7 (1.1)	7.8 (4.8)
Nerve agents	153	400 (1200)	1.0 (0.6)	4.0 (2.5)
Tear gas agents	159	30 (100)	0.2 (0.1)	0.6 (0.4)
Vomiting agents	153	100 (300)	0.6 (0.4)	1.1 (0.7)

For **biological warfare agents**, refer to the respective Guide for distances.

IMPROVISED EXPLOSIVE DEVICE (IED)

An IED is a “homemade” bomb and/or destructive device used to destroy, incapacitate, harass, or distract. Because they are improvised, IEDs can come in many forms, ranging from a small pipe bomb to a sophisticated device capable of causing massive damage and loss of life.

The following table predicts the damage radius based on the volume or weight of explosive (TNT equivalent) and the type of bomb.