

RADIOLOGICAL TERRORISM

Frequently Asked Questions

I. Terrorist Events

1. What types of terrorist events might involve radiation?

The events could include the introduction of radioactive material into the food or water supply, using explosives to scatter radioactive materials (dirty bombs), bombing or destroying a nuclear facility (low probability), or exploding a small nuclear device (also low probability). Some radioactive materials can be vaporized and sprayed widely; still others can be burned and vaporized.

2. What would happen if radiation were introduced into the food or Water supply?

It would cause a great deal of concern and fear; however, it probably would not cause much radioactive contamination or increase the danger of adverse health effects.

3. What would happen if a dirty bomb were used?

The explosion itself could cause serious injuries. The bomb would probably not have enough radioactive material to cause serious radiation sickness among large numbers of people. However, people exposed to the radiation could have a slightly greater risk of developing cancer later in life, depending upon their dose.

4. What would happen if a nuclear facility were bombed or destroyed?

A meltdown or explosion at a nuclear facility could cause a large amount of radioactive material to be released into the environment. People at the nuclear facility would probably be contaminated and possibly injured if there were an explosion. People in the surrounding areas could also be exposed or contaminated.

5. What would happen if a small nuclear device were detonated?

It could result in a lot of property damage, a lot of injuries and deaths. Many people would suffer from symptoms of acute radiation syndrome. Radioactive fallout would extend over a large region far from the point of impact, potentially increasing people's risk of developing cancer later in life. This is a low probability event.

6. What are the potential adverse health consequences from radiation exposure from a terrorist nuclear attack?

People may become externally exposed and/or internally exposed. If there is a nuclear detonation, bodily injury or death may occur as a result of the blast itself or as a result of debris thrown from the blast. People may experience moderate to severe skin burns, depending on their distance from the blast site. Those who look directly at the blast could experience eye damage ranging from temporary blindness to severe retinal burns.

A. Dirty Bombs

1. What is a dirty bomb?

A dirty bomb, or radiological dispersion device (RDD), is a bomb that combines conventional explosives, such as dynamite or TNT, with radioactive materials. Such bombs can be as small as a firecracker or as big as a truck. The idea behind a dirty bomb is to blast radioactive material into the area around the explosion. This could possibly cause buildings and people to be exposed to and contaminated by radioactive material. The main purpose of a dirty bomb is to frighten people and make buildings or land unusable for a long period of time.

2. How do dirty bombs compare to the atomic bombs in Hiroshima and Nagasaki?

The atomic explosions that occurred in Hiroshima and Nagasaki were conventional nuclear weapons involving a fission reaction. A dirty bomb is designed to spread radioactive material and contaminate a small area. It does not include the fission products necessary to create a large blast like those seen in Hiroshima and Nagasaki.

3. Is a dirty bomb attack more or less likely than a nuclear bomb attack?

A dirty bomb attack is much more likely to occur, mainly because of the prevalence of commercial radioactive materials and how easy it would be to construct a dirty bomb.

4. What are the terrorist's sources of radioactive material?

The most harmful radioactive materials are found in nuclear power plants and nuclear weapons sites. However, increased security at these facilities makes obtaining materials from them more difficult.

The radioactive materials that are easiest to obtain and most likely to cause harm are also ones that have significant commercial applications and are widely available. They are used in medical, academic, agricultural, and industrial settings around the world. This makes it extremely difficult not only to secure but to regulate these sources as well.

The U.S. Nuclear Regulatory Commission has estimated that approximately one licensed source is lost every day of the year in the U.S. alone. There have been about 700 incidents of illegal trafficking of radioactive materials worldwide including 440 incidents in the United States according to the International Atomic Energy Agency (IAEA). By far the most likely method terrorists can use to acquire radioactive material is open and legal purchase from a legitimate supplier.

There are no requirements that foreign suppliers selling radioactive material to verify the validity of any license submitted by a U.S. purchaser. Most reputable foreign suppliers try to be scrupulous about checking for valid licenses, but there are limitations to the process. In addition, U.S. exporters of radioactive material are not required to notify the authorities in the destination country that radioactive material has been shipped to their country or to verify that a foreign purchaser is authorized to receive the material. The only exceptions to these loopholes are for special nuclear material (plutonium or uranium that is usable in nuclear weapons), which is already safeguarded

5. Is anything being done to find the lost radioactive materials?

American and Russian officials have recently stepped up efforts to track down these materials and secure them.

6. What are the dangers of a dirty bomb?

The primary danger from a dirty bomb would be the blast itself. The levels of radiation created by the most probable sources are not high enough to cause severe illness from exposure.

7. What effect would a dirty bomb have on a large body of water, a pond, or a stream?

Contaminating large bodies of water would require much more radioactive material than would be contained in a dirty bomb. Some radioactive materials would sink to the bottom and stay there posing little threat to human health. It could, however, highly contaminate a small pond depending on the amount of radioactive material released and the type of radioactive material.

8. What types of Psychological Damage can a dirty bomb do?

The fear of ionizing radiation is deep-seated and frequently irrational. An RDD attack is unlikely to cause mass deaths, but it could cause tens to hundreds of fatalities under the right circumstances, and is almost certain to cause great panic and fear.

Some initial reactions could be shock, disbelief, and reluctance to abandon property, anxiety, and fear. Long-term psychological effects could be anxiety disorders, Post Traumatic Stress Syndrome, depression, anger and suspicion, feelings of powerlessness, feelings of being overwhelmed, and acute stress disorder.

9. What types of economic impacts could occur?

During the evacuation period, small businesses will suffer from lower or even zero cash flow. Small business owners will need to lay off or fire employees, will more than likely be unable to pay suppliers, and probably will be unable to pay mortgages. Even with business interruption insurance, a wave of bankruptcies is likely to follow, unless the government steps in and offers financial assistance to everyone from business operators to owners of buildings to mortgage holders. At this time, all commercial insurance policies sold in the United States exclude damage from radiation. Residents living within the affected zone will also need to be evacuated and sheltered, which will add to the already high economic cost associated with the RDD incident. It is unlikely that they will be able to return to their homes for weeks, months, or never at all.

People from other areas, outside of the area of the RDD attack, will refuse to buy almost all goods and foods that are exported out of the area. People will not want to buy goods or foods that came from a once contaminated area, irrationally believing that the goods are contaminated even if they are not. Also, tourist traffic will likely never resume.

The streets in the affected area of the incident will require decontamination, as will the exteriors of buildings and possibly interiors well. Decontamination will add to the already high costs related to the RDD incident. Unfortunately, there are no well-established technologies for wide area decontamination of modern built-up areas.

10. Are there any incidents in the past in which a dirty bomb was used?

Iraq tested a dirty bomb device in 1987 but found that the radiation levels were too low to cause significant damage. Iraq abandoned any further use of the device.

In 2002, Jose Padilla, an American citizen with known ties to Al Qaeda, was arrested on suspicion of planning to build and detonate a dirty bomb in an American city.

11. How much expertise does it take to make a dirty bomb?

Dirty bombs are relatively easy to construct. It does not take much more expertise to construct a dirty bomb than it does to construct a conventional bomb.

12. Is a dirty bomb a weapon of mass destruction?

No, they are better described as weapons of “mass disruption” that could spread fear and disrupt daily life. The health consequences from the use of a dirty bomb would be minimal. Widespread destruction would be unlikely. The greater concern is the long-term psychological, social, and political impacts.

13. Don't All Post Offices, Airports, and Border-entry points scan for radioactive materials?

Currently 0.5% of all shipments contain radioactive substances. It is not practical to inspect every truck and package to verify which ones contain radioactive substances and which ones do not.

14. Do terrorists have the types of radioactive substances that can be used in a dirty bomb?

International authorities have recorded hundreds of cases of trafficking in nuclear or radiological materials since the end of the Cold War. Many such supplies are subject to few controls or are poorly guarded, particularly in the former Soviet countries.

15. How do we know that a dirty bomb hasn't already been used in the U.S.?

There could have already been a terrorist release of radioactivity that went unnoticed because a RDD would not even require a bomb blast (a firecracker would work). A “silent” attack is possible, but not very probable. Terrorists usually want a lot of people to know about an attack immediately in order to cause terror. They can't cause terror if no one knows about the attack.

B. Suitcase Bombs

1. What are suitcase bombs?

In 1997, the public became aware of a Russian nuclear device called a suitcase bomb. A "suitcase" bomb is a compact and portable nuclear weapon and might have the dimensions of 24 x 16 x 8 inches. The smallest possible bomb-like object would be a single critical mass of plutonium(Pu-239) or uranium (U-233). It doesn't take much more than a single critical mass to cause a significant explosion ranging from 10-20 tons. As an example, if a device like this were used in Washington, D.C. it could destroy everything within a half-mile radius. Within hours, prevailing winds could carry the nuclear fallout through the rest of Washington, D.C. Radioactive iodine would be carried downwind for miles.

2. What is a backpack bomb?

Another portable weapon is a "backpack" bomb. The Soviet nuclear backpack system was made in the 1960s for use against NATO (North Atlantic Treaty Organization) targets in time of war. It consisted of three "coffee can-sized" aluminum canisters in a bag.

3. Who has suitcase bombs?

Some nuclear suitcase bombs may have been developed by the Soviet Union during the Cold War. There is a fear that some of the devices may be sold to terrorists. Russian scientists have testified they are certain that suitcase bombs were created, though the Russian government denies their existence.

C. Nuclear Blasts/Bombs

1. What is a nuclear blast?

A nuclear blast, produced by explosion of a nuclear bomb (sometimes called a nuclear detonation), involves the joining or splitting of atoms (called fusion and fission) to produce an intense pulse or wave of heat, light, air pressure, and ionizing radiation. The bombs dropped on Hiroshima and Nagasaki at the end of World War II produced nuclear blasts.

2. What happens when a nuclear device is exploded?

A large fireball is created. Everything inside of this fireball vaporizes, including soil and water, and is carried upwards. This creates the mushroom cloud that we associate with a nuclear blast. Radioactive material from the nuclear device mixes with the vaporized material in the mushroom cloud. As this vaporized radioactive material cools, it becomes condensed and forms particles, such as dust. The condensed radioactive material then falls back to the earth; this is what is known as fallout. Because fallout is in the form of particles, it can be carried long distances by the wind and end up miles from the site of the explosion. Fallout is radioactive and can cause contamination of anything on which it lands, including food and water supplies.

3. What sorts of effects are there from a nuclear blast?

The effects on a person from a nuclear blast will depend on the size of the bomb, the type of nuclear fuel used, the design of the device, whether it is exploded in the air or on the earth's surface, the geography of the surrounding area, the weather, and the distance the person is from the explosion. Nuclear blasts would likely cause great destruction, death, and injury, and have a wide area of impact.

In a nuclear blast, injury or death may occur as a result of the blast itself or as a result of debris thrown from the blast. People may experience moderate to severe skin burns, depending on their distance from the blast site. Those who look directly at the blast could experience eye damage ranging from

temporary blindness to severe burns on the retina. Individuals near the blast site would be exposed to high levels of radiation and could develop symptoms of radiation sickness (called acute radiation syndrome).

People may experience two types of exposure from radioactive materials from a nuclear blast: external exposure and internal exposure.

4. How can I protect my family and myself during a nuclear blast?

If you are near the blast when it occurs:

- Turn away and close and cover your eyes to prevent damage to your eyesight.
- Drop to the ground face down and place your hands under your body.
- Remain flat until the heat and two of the shock waves have passed.

If you are outside, but not near the blast site, when the blast occurs you should:

- Find something to cover your mouth and nose, such as a scarf, handkerchief, facemask, or other cloth. Keep your mouth and nose covered until the fallout cloud has passed.
- Remove any dust from your clothes by brushing, shaking, and wiping in a ventilated area—however, cover your mouth and nose while you do this, to reduce internal contamination.
- Move to a shelter, basement, or other underground area, preferably located away from the direction that the wind is blowing.
- Remove clothing since it may be contaminated; if possible, take a shower, wash your hair, and change clothes before you enter the shelter.

If you are already in a shelter or basement:

- Shut off ventilation systems and seal doors and windows until the fallout cloud has passed. After the fallout cloud has passed, unseal the doors and windows to allow some air circulation.
- Stay inside until authorities say it is safe to come out.
- Listen to the local radio or television for information and advice. Authorities may direct you to stay in your shelter or evacuate to a safer place away from the area.
- If you leave your shelter cover your mouth and nose with a damp towel or cloth until you return to the shelter.
- Use stored food and drinking water. Do not eat local fresh food or drink water from an open water supply.
- Clean and cover any open wounds on your body.
- If you are advised to evacuate:
 - o Listen to the radio or television for information about evacuation routes, temporary shelters, and procedures to follow.
 - o Before you leave, close and lock windows and doors and turn off air conditioning vents, fans, and furnace. Close fireplace dampers.

- o Take disaster supplies with you (such as a flashlight and extra batteries, battery-operated radio, first aid kit and manual, emergency food and water, non-electric can opener, essential medicines, cash and credit cards, and sturdy shoes).
- o Remember your neighbors and some family members may require special assistance, especially infants, elderly people, and people with disabilities.
- o If you have a car, keep a half tank of gas in it at all times.
- o Take your pets with you (have a plan on how you will care for pets in an emergency, most public shelters do not allow pets)
- o If time allows:
 - Call or email the “out-of-state” contact in your family communications plan.
 - Tell them where you are going
 - If there is damage to your home and you are instructed to do so, shut off water, gas and electricity before leaving
 - Leave a note telling others when you left and where you are going

5. What do I do if someone near me is injured in the nuclear blast?

Radioactive contamination of injured persons (or of emergency workers) is a hazard that can be dealt with after the life-threatening injuries of the person have been treated. Do not flood emergency rooms or doctor’s offices with non-emergency patients. The first priority for medical attention should be to physical injuries. Contamination with radioactive materials should not be a barrier to adequate and timely medical treatment of life threatening injuries.

6. Is a nuclear bomb the same as a suitcase bomb?

The “suitcase” bombs that have been described in news stories in recent years are small nuclear bombs. A suitcase bomb would produce a nuclear blast that is very destructive, but not as great as a nuclear weapon developed for strategic military purposes.

7. Would an airplane crash in a nuclear power plant have the same effect as a nuclear blast?

While a serious event such as a plane crash into a nuclear power plant could result in a release of radioactive material into the air, a nuclear power plant would not explode like a nuclear weapon.