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U.S. Nuclear Regulatory Commission

Fact Sheet on Dirty Bombs

Background

A "dirty bomb" or radiological dispersal device (RDD) is a conventional explosive or bomb containing radioactive material. The conventional bomb is used as a means to spread radioactive contamination. It is not a nuclear bomb and does not involve a nuclear explosion. Any type of radioactive material could be used in a dirty bomb, but in general these devices would be unlikely to cause serious health effects beyond those caused by the detonation of conventional explosives.

Impact of a Dirty Bomb

In most cases, any immediate deaths or serious injuries would likely result from the explosion itself, rather than from radiation exposure. It is unlikely that the radioactive material contained in a dirty bomb would kill anyone. The radioactive material would be dispersed into the air and reduced to relatively low concentrations, resulting in low doses to people exposed. In addition, most people would be expected to run away from the explosion, further reducing potential exposure. A low-level exposure to radioactive contamination could slightly increase the long-term risk of cancer.

However, a "dirty bomb" could potentially have a significant psychological impact, by causing fear, panic and disruption. Use of a dirty bomb could result in radioactive contamination of an area of a city, up to several city blocks, with low levels of contamination that would require cleanup. The extent of the contamination depends upon a number of factors including the size of the explosive, the amount and type of radioactive material used, and weather conditions. The detectability of radiation is a major asset in reducing health and safety impacts and in evaluating the accident. Cleanup of the contamination could be costly (conceivably running into the millions) and take weeks to months to complete.

Sources of Nuclear Material

There are millions of radioactive devices in the United States. The NRC authority is limited to radioactive material defined in the Atomic Energy Act (AEA) of 1954 as amended. There are about 21,000 licensed organizations in the U.S. which use such material for medical, industrial, academic, and research purposes. There are other types of radioactive material used in similar activities but NRC authority is limited to radioactive material defined in the AEA. For AEA material, about 5,000 licenses have been issued by NRC and about 16,000 licenses have been issued by some states (referred to as Agreement States because they have an agreement with the NRC, under the AEA, to regulate specific material). Most of these licenses involve radioactive material which, because of the nature of the material or the size of the source, are not of particular concern in terms of their use in a dirty bomb.

Control of Nuclear Material

NRC and state regulations require licensees to secure radioactive material from theft and unauthorized access. They also require reports of lost or stolen material. NRC receives about 300 reports per year of lost or stolen radioactive material. Most of the reports of lost or stolen radioactive material involve small or short-lived radioactive sources. Moreover, the losses have not been concentrated in one or two localities. Therefore, it is unlikely that the material unaccounted for is being collected for use in a dirty bomb. To better account for all sources, NRC has initiated a program to register certain higher-risk devices. Further, NRC is considering additional measures to track down missing sources.

Increased Security of Nuclear Material

Following the attacks on September 11, the NRC and the States advised their licensees to increase the security of nuclear material and be alert for and immediately report any unusual activities which might indicate a terrorist threat. The NRC is evaluating additional security measures for radioactive sources.

The NRC is cooperating with other Federal and State agencies to bolster contingency plans for dealing with a potential attack

involving radioactive materials. The NRC Headquarters Emergency Operations Center is ready around the clock to respond to radiological emergencies.

Response to a Dirty Bomb

- Because a "dirty bomb" explosion could expose people to loose radioactive material in the air, which could be inhaled, people are advised to quickly move away from the immediate area, at least several blocks from the explosion, and tune in to local radio or TV broadcasts for instructions from emergency officials.
- Emergency response officials will arrange medical treatment for those injured by the blast, evacuating people from the area, decontaminating those who were contaminated, and assessing any internal or external exposures. It should be noted that the use of potassium iodide would not necessarily be protective in these cases because radioactive iodine is not necessarily the isotope that would be used in these devices.
- The affected area will be cordoned off from surrounding areas.

Federal Role

- If it was definitely known that the dirty bomb involved material licensed by the NRC or an Agreement State, then the NRC would be the technical lead Federal agency for responding to the radiological aspects of the event. However, it would be highly unlikely at the time of the event (i.e., explosion) that the source of the radioactive material would be definitely known and the Federal Agencies involved would not quibble about which Agency had the technical lead.

  In the event the radioactive source is unknown or it is definitely not material licensed by the NRC or an Agreement State, the Federal Emergency Management Agency would be designated the lead Federal agency for consequence management. However, because it is a bomb, the Federal Bureau of Investigation would be the lead Federal agency for crisis management and take the lead in investigating the criminal aspects of the event. Other organizations that would be involved include the Environmental Protection Agency, the Department of Energy, the Office of Homeland Security, the Nuclear Regulatory Commission, and various elements of the law enforcement and intelligence community.
- In the event of a "dirty bomb" exploding, the NRC would be prepared to provide technical advice to local authorities for emergency response, including suggestions for protective measures and evaluation of radiological hazards.

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