



Information Analysis and
Infrastructure Protection,
Department of Homeland Security



Office of Intelligence,
Department of Energy

IAIP Analytic Red Cell Program



How Terrorists Might Use a “Dirty Bomb” Against the Homeland

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October 13, 2004

Project Overview

A Red Cell session was held jointly by the US Departments of Energy and Homeland Security on 8 June 2004 to examine the prospects of a RDD attack on the U.S. homeland. The 17 participants emulated terrorist cells, dividing into a “poorly resourced” and a “well resourced” group. Both groups operated independently and emulated al-Qaida and affiliated cells in preparing and conducting an attack.

Program Concept

The IAIP Analytic Red Cell program provides alternative assessments intended to provoke thought and stimulate discussion. Papers represent an assimilation of opinions, sources, and methodologies and are not necessarily derived from specific threat reporting. Papers are not meant to represent an IAIP, DHS, or U.S. Government corporate view.

***Summary:** An independent, unclassified analytic Red Cell session, sponsored jointly by the U.S. Departments of Energy and Homeland Security, found a Radiological Dispersal Device (RDD) attack on the U.S. homeland to be highly appealing from a terrorist standpoint. The Red Cell group, which simulated two different terrorist cells, believed an RDD attack would be relatively easy to prepare and mount and could have wide-ranging physical, psychological, political, and economic impacts. The group believed radioactive materials would be easy to procure, especially from abroad, and found a variety of potential targets across the country. Participants expected that public distrust of official guidance would heighten fear and panic. The session underscored the value of a multi-layered defense—focusing on enhanced detection, international controls, and public and media education—to reduce risks of an attack and improve emergency response.*

Why the Session Was Held

The U.S. Department of Energy (DOE) and Department of Homeland Security (DHS) held a session on the RDD (or “dirty bomb”) threat to the homeland because terrorism experts have long held that terrorists would like to use a weapon of mass destruction (WMD) to attack the United States—yet to date no such attack has occurred. Experts also frequently point to RDDs as a chemical, biological,

radiological, or nuclear (CBRN) device with WMD potential for terrorists because it:

- Provides a terrorist organization with the opportunity to execute a high visibility, horrific attack.
- May have significant consequences even if the primary target is completely or partially unaffected.

- Terrifies citizens independent of actual casualties inflicted.
- Requires materials and know-how that are accessible to determined terrorists.

Challenges to Analytical Assumptions

At the start of the session, the participants were challenged to spell out their initial operating assumptions about the objectives a terrorist group contemplating use of an RDD might have, and the challenges that the terrorist group would face. During the session, participants became less certain about a number of those assumptions:

- **Initial Assumption:** *To be a success, an RDD attack must result in a large number of casualties.*

While the participants believe that al-Qaida (AQ) continues to focus on inflicting casualties, they assessed that an RDD attack that resulted in panic and economic harm to the United States, together with the symbolic nature of the use of a radiological weapon on U.S. soil, would be sufficiently shocking that it would be considered a success even without a high body count.

- **Initial Assumption:** *It is hard to acquire the materials needed for an RDD.*

Participants assessed that moderately-knowledgeable terrorists would be able to obtain significant quantities of appropriate radioactive material overseas, although they agreed that obtaining the material domestically would be more difficult (but not impossible).

- **Initial Assumption:** *The United States probably could detect the import of such materials at our border.*

While detection systems in place at major Ports of Entry would present a challenge to the terrorists, the participants were confident that radioactive materials could be smuggled across U.S. borders by avoiding major Ports of Entry in favor of minor Ports of Entry, as well as by smuggling the material in smaller, shielded portions and subsequently recombining the material at a secure location on the U.S. side.

- **Initial Assumption:** *An RDD attack is too difficult to execute. Terrorists are more likely to attempt a chemical or biological attack if they decide to use a CBRN device.*

Several participants concluded the opposite based on the scenarios developed for launching RDD attacks. They noted that while the difficulties of handling radioactive material are comparable to those of chemical or biological agents, dispersing the material was considerably easier, which made an RDD attack technically less challenging.

- **Initial Assumption:** *An RDD attack is likely to be unsuccessful, or not attempted at all, due to increased security around desirable targets.*

An RDD attack need not need affect its primary target to be successful. Detonation of an RDD at a distance from the primary target can still cause casualties, economic disruption and fear.

Strong Interest in Using RDD

The two simulated terrorist cells concluded that they would find use of an RDD against the homeland very appealing because of almost guaranteed impact if the attack could be executed. They also found a large number of factors that they believed would make an attack worthwhile and successful.

The major constraints that the cells identified were in acquiring radioactive material and avoiding a spectacular failure. They judged that an attack must have a high chance of success, possibly including contingency plans, to avoid ignominy of arrest of the terrorists and capture of the device.

The two groups identified the following as factors that they believed terrorists would like to achieve through use of an RDD weapon—and could do so under certain circumstances:

- **Media Attention**—generate tremendous media attention and potential physical impact through contamination of large areas*, symbolic buildings, and monuments. American and foreign media would broadcast frightening and graphic images of the attack, thereby publicizing the terrorists' success.
- **Success Even In Failure**—psychological effects, combined with the costs of decontamination, qualify the attack as a success, even if the attack fails to inflict casualties or cause significant damage.
- **Defeating Security Measures**—mitigate the effectiveness of increased security measures, including extended perimeters, because of an RDD's potential extended area of effect.

* Buildings, city blocks, or even many acres, depending on the quantity of material and effectiveness of dispersal

The Two Terrorist Emulation Teams

Participants were divided into two al-Qaida-like teams, intent on causing significant harm to the United States through the use of a radiological device.

“Well-Resourced” Cell:

- Ample Funds
- Large Organization
- Wide Range of Specialists
- Extended Planning Cycle
- Extensive Support Network

“Poorly-Resourced” Cell:

- Minimal Funds
- Small Organization (10 or fewer people)
- Limited Expertise (may hire outside experts)
- Shorter Planning Cycle
- Minimal Support Capability

- **Lower Tech/High Impact**—satisfies AQ's preference for simple methods that generate high impact.
- **Deny Access**—affect the strategic environment by denying the United States access to important assets for an extended period through radiological contamination.
- **Extended Area of Effect**—potential of an RDD to affect a wide area means many proximate secondary targets are impacted, even if the attackers are unable to reach their primary target.
- **Diversity of Effects**—wide range of effects—casualties, physical destruction and psychological, political, and economic impact—increases the probability that the terrorist group will consider the attack a success.
- **Difficulty of Response**—presence of radioactive material presents a formidable obstacle to first responder operations, increasing damage and recovery time.

- **Psychological Impact**—radioactive material causes an extreme public reaction and results in a success as long as the radioactive material is detectable. Terrorists could also mix actual attacks with anonymous messages to the media claiming radiation release in order to achieve their objectives.
- **Exacerbate Public Mistrust**—both groups suspected that the American public would distrust government guidance in the wake of an RDD event, particularly concerning the danger (or lack of danger) in reoccupying buildings and continuing daily activities in contaminated areas if any detectable levels of radiation persist.
- **Economic Impact**—cause significant economic disruption given costs and timeframes associated with decontamination, structural repair, and additional security measures that might be adopted in reaction to the attack.
- **Recruitment Potential**—help the terrorists' public relations abroad with their affinity groups, increasing their ability to recruit new members and gain financial support.

Acquisition and Transportation

While both Red Cell groups considered acquiring radioactive material to be the single biggest impediment to successfully conducting an RDD attack, both groups were convinced that a determined terrorist cell could acquire a sufficient quantity of radioactive material either overseas or domestically. Participants deemed that because of the effectiveness of controls on radioactive material in the United States, a well-resourced terrorist group was more likely to attempt to deliberately acquire radioactive material overseas in countries with lax controls. A poorly-resourced group would be more likely to take advantage of opportunistic access to the material, whether it was located within the United States or outside its borders.

Scenario: Hand-Delivered RDD on the National Mall

A domestic group of jihadists, sympathetic to al-Qaida's cause, opportunistically procures a significant quantity of yellow cake. Lacking funding and logistical support, the group stealthily disperses the material by hand throughout the National Mall in Washington DC, and after several days announces the attack to the media. While primarily a nuisance attack, the presence of radioactive material around the nation's capital causes anxiety throughout the capital area. Additionally, the cleanup efforts would be both costly and disruptive, particularly if the material had been further dispersed by wind and foot traffic.

- Because neither group focused on inflicting casualties as a primary objective, they felt that operational considerations such as availability of material, ease of storage, etc. would be more important to the terrorists than would considerations of specific isotopic properties of radioactive sources.
- Smuggling the radioactive source into the country was deemed to be within the capability of either group, although the well-resourced group was assessed to be more likely to attempt that course of action.

Participants examined several overseas acquisition options:

- **Purchase from legitimate source** including medical, industrial and commercial suppliers.
- **Steal from legitimate source** such as mining operations, storage facilities, industrial, medical, or academic facilities, and construction sites.
- **Purchase from illegitimate source** including organized crime, corrupt government officials, and co-opted employees.

Scenario: Suicide Bombers at Penn Station

A well-resourced terrorist organization procures a quantity of cesium chloride (CsCl) on the international black market. The material is broken into a number of small, shielded packages and smuggled into the United States and recombined at a safe house. The material is then provided to a sleeper cell. Two members of the sleeper cell strap the CsCl-laced explosives onto their bodies and proceed through different entrances to opposite ends of New York City’s Penn Station before simultaneously detonating the devices. The panicked victims and first responders expose themselves both within the station and at entrance/exit points. In the event the bombers panic or are incapacitated, the devices can be detonated remotely.

Participants also discussed how to transport the materials into the United States, emphasizing the ease of transportation. Almost any mode of entry would suffice, with a few exceptions.

- They would avoid major ports, airports, or border crossings that they believe would have radiation detection equipment, choosing instead small Ports of Entry judged less likely to have detection equipment.
- Even if detection equipment were present, the groups believed that the ease of shielding radioactive material and the limited detection range of existing monitors meant that detection equipment posed little threat.

The Red Cell groups also assessed that radioactive material could be acquired domestically, and cited medical, industrial and commercial suppliers, hospitals, food irradiation facilities, and construction sites as possible venues. Also mentioned were less likely sources, such as large numbers of smoke detectors (purchased in small quantities from various locations), the trucks or storage depot that carry and store the Americium to smoke detector manufacturers, and uranium/ yellowcake mining and refining plants. The groups

thought that material from these sources could be stolen, but noted that such a theft would likely be quickly noted.

Target Selection—A Wide Variety Nationwide

The Red Cell identified a wide range of targets that would accomplish their aims. Moreover, they noted that multiple simultaneous attacks, not all of which would be RDD events, might add to the effect. Long-term denial of strategically important areas through contamination was also an important consideration. Possible target sets (in approximate order of presumed preference) include:

- Examples of U.S. “Decadence”—Mardi Gras, Casinos, 4th of July or New Year’s outdoor celebrations.
- Economic Centers—Stock Exchange, FedEx Facilities.
- Symbolic Targets—U.S. Mint, National Parks, Statue of Liberty, White House, Capitol.
- Public Transportation Hubs—New York’s Penn Station, Washington’s Union Station, the Springfield, VA I-95 “Mixing Bowl.”

Scenario: RDD on Wall Street

A terrorist organization plans an attack on the New York Stock Exchange (NYSE) using suicide bombers. Two bombers, equipped with RDDs consisting of several pipe bombs surrounded by cesium chloride with remote detonation devices placed inside of backpacks, drive to Wall Street and exit the car near the NYSE. The bombers begin to make their way towards the entrance to the NYSE, but security personnel detain them outside. The terrorists detonate both devices before the backpacks can be searched. After the bombs contaminate the immediate area of the NYSE, people flee the area and spread the contamination even further. While the primary target is not significantly damaged, the contamination will severely hamper business activities and cleanup activities in the business district.

- Centers of Family—Malls, Schools, Universities, Day Care.
- Agricultural Centers/Infrastructure—Water Supplies, Reservoirs, Farms, Food Processing Centers

- Host media training sessions to increase the media's understanding of RDDs.
- Continue to develop and test plans to disseminate guidance to the public following an RDD attack.

Public Perceptions: The participants suggested that the target of any radiological attack in the US would become a new symbol of terrorism (as happened with the bombing of the Alfred P. Murrah Federal Building in Oklahoma City), and thus almost any radiological attack would be deemed a success.

Nightmare Scenario: Campaign of RDD and Conventional Attacks

A terrorist organization launches an initial attack using an Improvised Explosive Device (IED) enhanced with a radiological source. Authorities quickly identified the attack as a RDD attack. Shortly thereafter, the terrorists explode conventional IEDs along escape routes from the affected area (e.g., bridges), and anonymously (and falsely) alert the media that all of the explosions have dispersed radiation. The terrorists then detonate other explosive devices, some of which actually are RDDs, every week in a different city and send anonymous tips to the media that each explosion has dispersed radiation.

Recommendations

Though RDD attacks represent a new kind of potentially dangerous attack, steps can be taken to mitigate the threat:

Public and Media Education:

- Increase public education on RDDs to reduce psychological effects, to include conducting a public awareness campaign focused on the effects of different types of radiation, measures the public can take to protect themselves in the event of an attack, and the effectiveness of remediation efforts in the wake of an attack.

Smuggling Security:

- Place greater emphasis on detection and prevention of untracked radioactive material entering the United States.
- Continue detection efforts at major Ports of Entry.
- Widely deploy and publicize deployment of detectors at all Ports of Entry; short of that, implement a publicized program of portable detectors that are randomly placed and moved between smaller Ports of Entry. Supplement with a non-publicized program of detectors randomly deployed at all Ports of Entry and at border locations where smuggling operations are suspected.

Acquisition Interdiction:

- Continue to foster an environment of international awareness and radiological security through such agencies as the International Atomic Energy Agency (IAEA).
- Seek bilateral partnerships that bolster Critical Infrastructure Protection (CIP) efforts in the nuclear and radiological arena.
- Continue education efforts by governmental and private entities, both domestically and internationally, to quickly report known or suspected incidents of theft or otherwise unauthorized procurement of radioactive material, or specialized remote handling or shielding equipment to unusual clients.

Improve Response to Actual RDD Events:

- Train responders on appropriate techniques and procedures for handling an RDD event, including the rapid identification of isotope type and quantity.
- Stage equipment needed to identify radioactive material and facilitate cleanup.

Red Cell Participants*

- Department of Homeland Security (Specialists from Information Analysis, Science and Technology, and Border and Transportation Security)
- Department of Energy (Specialists from National Nuclear Security Administration and Office of Nuclear Energy/Science and Technology)
- Nuclear Regulatory Commission
- Sandia National Laboratory
- Defense Threat Reduction Agency (DTRA)
- Monterey Institute, Center for Nonproliferation Studies
- Center for the Study of Traumatic Stress and Department of Psychiatry, Uniformed Services University of the Health Sciences
- Applied Marine Technology Inc.
- Highway Watch Program, American Trucking Associations
- Technologist from a Fortune 50 company
- Information Technology expert
- Novelist

*** Participants were asked to present their best professional opinions but were not speaking on behalf of their respective employers nor necessarily representing the corporate position of their employers. Not all participant agencies agree with all opinions or conclusions expressed in this paper.**