

# NUCLEAR TERRORISM

## Weapons for Sale or Theft?

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*The theft of a tactical nuclear weapon or the purchase of weapons-grade nuclear material by terrorists is a 21<sup>st</sup>-century nightmare that may well come true, says Dr. Gavin Cameron. An assistant professor of political science at the University of Calgary, Canada, Cameron is the author of Nuclear Terrorism: A Threat Assessment for the 21st Century (2001) and has written numerous articles on the threats posed by the terrorist use of weapons of mass destruction. In this article he takes readers through four distinct nuclear terrorist scenarios: stealing an intact nuclear weapon; stealing or buying weapons-grade fissile material; attacking a nuclear site in order to cause a contamination incident; and using radioactive material to make a "dirty bomb."*

Although nuclear terrorism has been a source of speculation and concern from the mid-1970s onward, the end of the Cold War heralded additional fears about the ability of sub-state actors to acquire weapons of mass destruction. At one time experts argued that terrorists wouldn't try to maximize casualties, employing violence instead as a means of coercing concessions from governments. Top terrorism analyst Brian Jenkins, of the RAND think tank, once observed of 1970s-era terrorist objectives: "Terrorists want a lot of people watching, not a lot of people dead."

Since 9/11, the "rules" have changed, and few experts would suggest that there are not at least some terrorists who do want to inflict mass casualties. In that context, nuclear terrorism does not only represent an effort to intimidate and coerce, but also poses a critical threat to states and peoples around the world.

Nuclear terrorism incorporates four distinct types of terrorist activity:

- the theft and use of an intact nuclear device
- theft or other acquisition of fissile material which would then be used to make a nuclear weapon
- attacks on reactors or other nuclear facilities with the goal of causing radiological contamination of surrounding areas
- the use of radiological material to make a radiological dispersal device (RDD)

Of these, the RDD, or "dirty bomb," is the easiest to achieve and thus most likely to occur, but the theft of an intact nuclear device or of the fissile material with which to make a nuclear device represent the deadliest risks.

### THE THEFT OF AN INTACT NUCLEAR DEVICE

Roughly 30,000 nuclear weapons exist worldwide. Several hundred weapons are vulnerable to theft by terrorists or criminals who might sell them to terrorist organizations. It is clear that some such groups are interested in acquiring a nuclear device: Aum Shinrikyo and al-Qaida have both actively sought to purchase a weapon.

It seems improbable that a state would deliberately provide a nuclear weapon to a terrorist group. Fear of retribution from the attacked state and international community, potential loss of control over the nuclear-armed terrorist group, and a reluctance to surrender nuclear weapons to another party due to the intrinsic difficulty of acquiring them all mitigate against such state sponsorship. Nevertheless, North Korea's February 2005 announcements that it possesses nuclear weapons



Rescue workers and medical personnel attend to subway passengers in Tokyo affected by a sarin gas attack, March 20, 1995. Aum Shinrikyo, the terrorist group that carried out the attack that killed 12 persons and injured thousands, has sought to acquire nuclear material that could be used to build weapons. (Chikumo Chiaki, AP Wide World Photos)

and intends to build more underscore particular concerns in this context, given that state's history of selling missile technology to other states. More likely than state sponsorship, however, is the possibility that military or scientific elites in some states might be willing, for ideological or financial reasons, to provide nuclear weapons, materiel, or expertise to terrorist organizations.

Still, the United States and Russia maintain the world's largest nuclear stockpiles. While many nuclear weapons in Russia are adequately protected from theft, others are not. Many Soviet-era tactical nuclear devices are especially vulnerable, and given the smaller size of such weapons, would be particularly suitable for use by terrorists.

### **THE THEFT OF FISSILE MATERIAL TO BUILD A NUCLEAR DEVICE**

Obtaining fissile material represents the second, and more probable, route to the possession by terrorists of a nuclear device. It is this acquisition of material that

represents the chief barrier to such a weapon. Nuclear devices with military-level efficiency may go beyond the capability of most terrorist organizations. The U.S.-led War on Terror has meant that few states are likely to grant terrorist organizations the time, space, resources and expertise necessary for such a sophisticated device. Therefore, the more likely scenario would be terrorist construction of an Improvised Nuclear Device (IND). This would be less sophisticated than a military-level weapon but could be highly effective in causing mass casualties. An IND also would not require knowledge beyond that which is already available in the open literature. It assumes that the most likely device is the relatively simpler gun-type weapon, using uranium (U-235), rather than a more complex implosion weapon that requires plutonium (Pu-239). Such a gun-type device does, however, require large quantities (approximately 50 kg) of highly enriched uranium (HEU). Without state assistance, it is unlikely that even the most sophisticated terrorist organization could enrich nuclear materials in the

volume needed for a full-scale weapon. Therefore, the primary risk comes from the terrorist acquisition, whether through sale or theft, of state-produced fissile material.

As with intact nuclear devices, nuclear materials have been the target of several groups, most notably al-Qaida and Aum Shinrikyo. Both sought to acquire weaponizable material from the states of the former Soviet Union in the 1990s, although Aum Shinrikyo also tried and failed to enrich natural uranium. In spite of the difficulties both experienced in their acquisition efforts, the risk of terrorists gaining access to nuclear material remains considerable.

The amount of existing nuclear material scattered around the world in military and civilian sectors is enormous. Harvard University's Graham Allison says there is sufficient plutonium and highly enriched uranium to produce 240,000 nuclear weapons. Of course, security practices vary. In many states, such material is adequately protected, controlled, and accounted for, but elsewhere security measures are much looser.

Consequently, there have been regular reports of the embezzlement, theft, or smuggling of nuclear materials from facilities. In this respect, the Newly Independent States of the former Soviet Union represent a particular concern, largely due to the quantities of material present there; but similar reports have emanated from states around the world. So far, the majority of incidents have involved small quantities of weapons-grade material, or larger quantities of non-weapons-grade nuclear material. The risk, however, is clearly present. Moreover, given that accounting standards are not universally high in all states, it is far from clear whether authorities would know in all cases if a significant quantity of weapons-grade material, sufficient to construct a nuclear device, were to go missing.

### **ATTACKS ON REACTORS OR OTHER NUCLEAR FACILITIES**

Reactors and other parts of the nuclear fuel cycle—such as enrichment, storage, or spent-fuel reprocessing facilities—are vulnerable to attack by terrorists, and offer the potential to cause significant radiological contamination in the vicinity. Theoretical scenarios include not only suicidal airplane or truck-bomb attacks to cause dispersal of nuclear materials from the facilities via an explosion, but also the possibility of a group with knowledge of the design of a facility causing a leak by compromising a facility's safety systems, such as those relating to cooling and containment. Nuclear facilities

have been regularly threatened by terrorist groups with a range of motivations. Traditionally, single-issue, anti-nuclear groups have formed a significant part of this trend, although politically motivated groups, such as the separatists of ETA [Basque Fatherland and Liberty], have also attacked facilities. ETA targeted facilities before they went "on-line," and anti-nuclear or environmental groups are unlikely to cause precisely the type of incident that they most fear. However, more worrying has been the regular threats made against Russian facilities by Chechen separatists. The planners for the 9/11 attack also considered targeting a U.S. nuclear facility, although they ultimately rejected the idea.

### **RADIOLOGICAL DISPERSAL DEVICES —"DIRTY BOMBS"**

Even low-grade nuclear material would have value as part of a dirty bomb. Materials in this category are readily available within a wide range of applications in both the civilian and military sectors (cesium-137, for example, is commonly used in hospitals for x-rays). Such low-grade nuclear materials, or radioactive sources, are used widely, are far less protected than weapons-grade material, and are consequently vulnerable to exploitation by terrorist groups. This availability makes a radiological dispersal device (RDD) the most accessible type of nuclear weapon for terrorism, since such a device need only be a radiological source placed next to a conventional explosive. The most notable terrorist use of radiological material was in 1995, when Chechen separatists left a case of cesium in a Moscow park as a demonstration of capability.

### **WHAT IS TO BE DONE?**

The priority for all states must be accurately to account for and safeguard nuclear weapons and weapons-grade nuclear material. Strengthening the protection of nuclear facilities, such as reactors, against attack and safeguarding low-grade nuclear materials is also a key priority. Actively supporting the International Atomic Energy Agency (IAEA) "Action Plan for the Safety and Security of Radiation Sources" would certainly be helpful. Beyond accounting, however, there is a limit to the ability of states to protect fully all radioactive material within each's territory. Providing assistance to states to reinforce reactors and other facilities against terrorist attack would also help counter the potential for catastrophic incidents, but it can only be a partial solution.

States should focus primarily on preventing a terrorist from gaining access to or using a nuclear device because of the devastating effects of an explosion. Meaningful protection, control, and accounting, not only of all weapons but also of all weapons-grade nuclear material, is essential. It is clearly a vast undertaking, both financially and logistically. Securing international stockpiles of material is a priority for many states, and that must continue and be expanded. This necessitates not only one-time expenditures to secure such materials, but also ongoing commitments to ensure that storage facilities continue to be secure and, wherever possible, nuclear material and nuclear weapons are kept from terrorists or those who would provide them to terrorists.

Finally, it is essential to limit the growth of newly minted weapons and material from reaching market.

That links with the broader nonproliferation regime and necessitates promoting the goals of the Nuclear Non-Proliferation Treaty (NPT) and the work of the IAEA by encouraging disarmament and the destruction of existing stockpiles, along with campaigning for universal membership of the NPT. It also necessitates, in my view, promoting actively the Comprehensive Test-Ban Treaty and the Fissile Materials Cutoff Treaty.

The alternative is too grave to permit otherwise. ■

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*The opinions expressed in this article do not necessarily reflect the views or policies of the U.S. government.*