



Nuclear Terrorism

*A Briefing Paper from
International Physicians for the Prevention of Nuclear War*

Introduction

Since the September 11th attacks on New York and Washington, concerns about the potential for nuclear terrorism have risen dramatically. The consequences of an act of nuclear terrorism would be devastating in many respects — human, social, psychological, economic, and political.

Recent news reports have raised alarms. The Times of London reported in late October that one of the four airliners hijacked on September 11, the United Airlines flight that crashed in a Pennsylvania field, may have been headed for a nuclear power plant in that state, possibly the Three Mile Island facility. The arrest and questioning by Pakistani authorities of three leading Pakistani scientists, two of them veterans of Pakistan's nuclear weapons program, with known sympathies for the Taliban, has raised concerns about the transfer of nuclear know-how or even nuclear materials to that regime or Osama bin Laden's Al Qaeda organization. Long-standing concerns over the security of nuclear weapons and fissile materials in the former Soviet Union, and the whereabouts of former Soviet weapons scientists are once again at the fore.

Osama bin Laden has stated that acquiring nuclear weapons is a “religious duty” and the International Atomic Energy Agency has concluded that Al Qaeda is “actively seeking” an atomic bomb. Testimony by Jamal Ahmad al-Fadl, a former bin Laden associate, in the trial of those convicted in the 1993 World Trade Center bombing, recounted al-Fadl's extensive but unsuccessful efforts to acquire enriched uranium for Al Qaeda.

Nuclear terrorism could take many forms, any one of which would be a disaster by any measure. But some would be potentially more devastating than others. In this briefing paper, International Physicians for the Prevention of Nuclear War (IPPNW), recipient of the 1985 Nobel Peace Prize, summarizes four of the scenarios that comprise the nuclear terrorist threat and concludes with some recommendations on how to prevent nuclear terrorism.

Types of Nuclear Terrorism

The purpose of this briefing paper is to outline in summary fashion potential scenarios for nuclear terrorism. Each scenario has significant, if not enormous, public health implications and would, as in the case of the anthrax outbreak, place doctors and health professionals on the front lines of any attempted response.

It is likely that many of these scenarios would immediately outstrip the abilities of even the most sophisticated and well-equipped national health system to respond.

Radiological Dispersion Weapons

From a technical perspective, a radiological dispersion weapon (often referred to in media reports as a “dirty bomb”) would be the simplest for a terrorist to make and use. It would also be an effective weapon of terror. Severe disruptions would result from the widespread fear of radioactive contamination, and long-term health effects, particularly increased cancer deaths, would result.

Low-level radioactive wastes, such as medical waste and some of the by-products of nuclear power generation, are abundant and relatively unsecured. Using conventional explosives, such materials could be disseminated over a wide area causing panic, illness, and contamination that could cost billions to clean up.

Bruce Blair, a nuclear weapons expert who now heads the Center for Defense Information in Washington, DC, estimates that a casket-sized radiological dispersion weapon loaded with spent fuel from a nuclear power plant and detonated in New York City at mid-day would cause 2,000 immediate deaths and injure thousands more, overwhelming medical facilities ill-equipped to manage a large number of radiation-related casualties. Of course, the amount of radioactive material, the amount of

explosive, and the time and place of detonation could vary greatly.

An even more lethal radiological weapon could be made using the fissile materials needed for a nuclear weapon — highly enriched uranium (HEU) or plutonium. Even without building a device capable of creating a nuclear explosion, the dispersal of such highly radioactive and lethal materials using a conventional explosive would be extraordinarily deadly. Although obtaining HEU or plutonium would be more difficult than obtaining low-level radioactive wastes, it is well known that Al Qaeda has on several occasions sought to purchase such material, believed to originate in the former Soviet Union (FSU). Concern about the quality of safeguards for protecting HEU and plutonium in the FSU is widely shared by governments and non-governmental organizations working on nuclear proliferation issues.

Buying or Stealing a Nuclear Weapon

All of the technical and logistical obstacles involved in building a nuclear weapon can be avoided if a terrorist organization is able to procure an existing nuclear weapon.

One especially disturbing scenario involves so-called “suitcase” bombs—compact one-kiloton nuclear weapons—made by the Soviet Union in the 1970s. There have been conflicting reports about whether all of these weapons are accounted for, and some concern that such weapons may have been sold by profiteers in the wake of the Soviet Union's collapse in the 1990s. Some experts have suggested that the technical expertise of a Soviet scientist familiar with their construction would be required for detonation, and there is some question about whether such weapons would even work after decades without maintenance. But the unknowns about such mini-nukes, combined with their portability, is cause for deep concern.

Procurement of an existing nuclear weapon from Pakistan is also a concern. Thought to weigh about 1,500 pounds each, but small enough to fit inside a shipping container or truck, Pakistan's small nuclear arsenal is believed to comprise about 20 Hiroshima-sized (15-kiloton range) bombs. IPPNW's 1999 study *Bombing Bombay? Effects of Nuclear Weapons and a Case Study of a Hypothetical Explosion* estimated that the explosion of a 15-kiloton nuclear weapon in Bombay would cause between 160,000 and 866,000 deaths, depending on where in the city the bomb was detonated.

The Pakistani military, its intelligence services, and its nuclear establishment are known to be salted with supporters of the Taliban regime in Afghanistan and supporters of Osama bin Laden. Should social and religious unrest in Pakistan result in the overthrow of the Musharraf regime in favor of a fundamentalist government, there is concern that Pakistani nuclear weapons could fall into the hands of Al Qaeda. Pakistan's nuclear weapons are known to lack many of the technical safeguards needed to prevent unauthorized detonation.

A Hiroshima-sized nuclear bomb, though small by modern standards, is capable of killing hundreds of thousands of people or even more in an urban area and causing massive casualties in the aftermath from radiation sickness, epidemics, and contamination of water and food supplies.

Building a Nuclear Weapon

It is widely recognized that the highest hurdle for any nation or sub-national group seeking to build a nuclear weapon is obtaining the fissile materials needed to do so. There are vast quantities of such material in the world, but only a football-sized amount of the material, weighing perhaps 20 pounds or so, would be sufficient. The Nonproliferation Policy Education Center estimates that there may be as much as 20 tons of “surplus” plutonium and 500 tons of “surplus” HEU in the former Soviet Union alone.

There is considerable concern that Osama bin Laden could have obtained such materials from sympathizers within the Pakistani nuclear, intelligence, and/or military establishments, or from rogue elements of the Russian military or organized criminal elements in the FSU.

The remaining materials required to construct a bomb are readily obtainable. Indeed, according to Theodore Taylor, once one of the leading nuclear scientists in the United States, a knowledgeable nuclear scientist could do so with materials that could be purchased at a hardware store.

Such a bomb would likely have an unpredictable yield. But even a so-called “fizzle yield” bomb (that is, a bomb packing the power of about 1,000 tons of TNT) would be powerful enough to level several city blocks and disperse radiation over a large area.

Key conclusions reached by IPPNW in its 1996 study *Crude Nuclear Weapons: Proliferation*

and the Terrorist Threat are still valid today. Among them:

- A determined sub-national group can fabricate a simple and crude, yet highly lethal, nuclear device if it can obtain 28 pounds of HEU or as little as 18 pounds of plutonium.
- The break-up of the Soviet Union and the proliferation of nuclear technology has made the fissile materials needed to make crude nuclear devices more accessible, removing one of the greatest obstacles to terrorists.
- Use of a crude nuclear device could kill and injure tens of thousands of people and cause massive social disruption and panic. Medical services would be overwhelmed by the injured.

Nuclear Power Plants and Nuclear Weapons Facilities

There are approximately 100 nuclear power stations in the United States (in 31 states) and dozens of other sites that are, or were, part of the US nuclear weapons production complex. Targeting such a site for terrorism requires none of conditions described above to produce radiation or nuclear weapons and presents none of the hurdles for acquiring or building a nuclear weapon.

In mock exercises to test security at nuclear power plants before September 11, the failure rate was about 50 percent. These tests were designed to test defenses against theft of nuclear materials and sabotage. Detailed information about the design and layout of US nuclear facilities, as well as their structural flaws and security weaknesses was widely available on the Nuclear Regulatory Commission (NRC) website before September 11. It has since been removed.

After September 11, the NRC admitted that it had never considered the possibility that an airliner loaded with jet fuel might be used as a missile to try and destroy a nuclear power plant and that the effects of the impact of such a missile on a nuclear reactor's containment structure was not known.

What is known is that the breach of such a containment structure would be a major disaster on the scale of Chernobyl where the long-term health effects are still being measured and a huge area surrounding the plant remains uninhabitable. According to the Union of Concerned Scientists, a successful attack on the Indian Point nuclear power plant north of New York City could contaminate areas up to 100 miles away and require the evacuation of 20 million people, a practical impossibility. The long-term health effects would be staggering.

According to David Kyd, a spokesman for the International Atomic Energy Agency, "a deliberate hit of that sort [an airliner loaded with fuel] is something that was never in any scenario at the design stage [of nuclear power plants]. These are vulnerable targets and the consequences of a direct hit could be catastrophic."

Another related problem is the regular transport of low-level, high-level, and transuranic nuclear waste through major population centers by truck and by rail throughout the United States. Such transport provides tempting targets of opportunity for terrorists.

What Must Be Done

Efforts by the international community to contain the proliferation of nuclear weapons have not succeeded. The Nuclear Non-Proliferation Treaty (NPT) of 1970 commits the officially recognized nuclear powers that signed the treaty (the US, the USSR, China, France, and the UK) to elimination of their nuclear arsenals in exchange for a promise from the non-nuclear states to refrain from acquiring nuclear weapons. Since the treaty was signed, many nations have acquired nuclear weapons or made significant efforts to acquire them. This was perhaps inevitable in a world in which a handful of countries continued to insist that nuclear weapons were essential for their own national security, while they sought to keep other nations from coming to the same conclusion. In short, the promise central to the NPT has not been kept.

Whether the world is fortunate enough to pass through the current crisis, and crises to come, without an act of nuclear terrorism or the use of nuclear weapons by a state, there can be no higher priority for the international community than to reckon with the implications of nuclear weapons and nuclear proliferation by taking immediate and forceful steps to reduce the threat of nuclear weapons use.

Prevention will require a multi-faceted international effort that must include at least the following steps:

1. A ban on the manufacture, transfer and sale of fissile materials.
2. Establishment of international standards for the disposal and safeguarding of even low-level radioactive wastes.

3. Bringing all fissile materials under strict international control and safeguards with a rigorous system of accounting and international inspections.

4. Increase funding for joint Russian-American programs already underway to help secure Russia's sprawling nuclear weapons complex. (Ironically, just prior to the September 11 attacks the Bush Administration proposed to cut \$100 million from the Russian-American Cooperative Threat Reduction Program which seeks to secure nuclear materials in the FSU.)

5. Entry into force of the Comprehensive Test Ban Treaty (CTBT) long viewed by the international community as an essential step in halting the proliferation of nuclear weapons. This will require a reversal of the Bush Administration's policy of opposing the CTBT, and a change in direction by the US Senate which refused to ratify the CTBT during the Clinton Administration.

6. Deep reductions in existing nuclear arsenals as a signal that the major nuclear powers, particularly Russia and the United States, will take more seriously the commitment made in the NPT to eliminate nuclear weapons. It is essential that nuclear weapons be de-legitimized as instruments of military and political power.

7. Diversion of the billions of dollars to be spent on missile defense to programs designed to counter the far more immediate and real threat of nuclear terrorism, including programs to secure fissile materials, purchase and destroy or render unusable all known stocks of HEU and plutonium, monitor and detect the illicit trade in nuclear materials and technology, deter the illicit international transport of nuclear weapons of any type, and provide meaningful employment for nuclear weapons scientists from the FSU.

8. Increase security measures around all nuclear power plants and other nuclear facilities, which represent major potential sources for nuclear proliferation and targets for would-be nuclear terrorists. Cease construction of all new nuclear power facilities and begin phasing out the approximately 430 plants still in operation.

9. An international convention on nuclear terrorism based on a proposal by Russia in the United Nations that would define offenses deemed to be acts of nuclear terrorism, mandate sharing of information related to potential acts of nuclear terrorism among states, provide for extradition and prosecution measures for those perpetrating acts of nuclear terror, and establish standards for the handling of radioactive material, devices, or facilities seized following the commission of an offense.

10. The negotiation of a Nuclear Weapons Convention (NWC), a treaty to ban the development, testing, production, stockpiling, transfer, use, and threat of use of nuclear weapons.

It is often argued that existing and proposed international treaties such as those mentioned in this briefing paper are useless against terrorist organizations such as Al Qaeda. But, as *The Economist* recently editorialized, "On the contrary, [treaties] establish the norms that make its [the terrorist organization's] threatened actions a crime. And Mr. bin Laden is no Dr. No, with lavish weapons laboratories of his own; whatever he does have has been filched, one way or another, from government-run programs."

In short, the best hope for preventing nuclear terrorism lies with changing the behavior of the states that are the source, wittingly or through neglect, of the tools of nuclear terror.

Sources

The Economist (September 3, 2001)

"The Nuclear Terrorist Threat," Institute for Science and International Security (1997)

The Times of London (various reports)

The New York Times (various reports)

"The Big One," *The New Republic* (October 29, 2001)

"Nuclear Attack a Real, if Remote, Possibility," *The Christian Science Monitor* (October 31, 2001);

Crude Nuclear Weapons: Proliferation and the Terrorist Threat, IPPNW Global Health Watch Series (1996) by Frank Barnaby, Gururaj Mutalik, MD, Peter Taylor, and David Sumner;

Bombing Bombay? Effects of Nuclear Weapons and a Case Study of a Hypothetical Explosion, IPPNW Global Health Watch Series (1999) by M.V. Ramana;

Center for Defense Information;

Union of Concerned Scientists;

Physicians for Social Responsibility.

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