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The possibility that terrorists might steal fissionable material or nuclear weapons, attack nuclear facilities, use radioactive material to contaminate, or create alarming nuclear hoaxes has drawn increasing attention from government, the news media, and the public. Sober scientists, sensationalist journalists, and imaginative novelists have warned us that nuclear blackmail by terrorists is the coming threat. These possibilities have obviously been considered, or will undoubtedly be considered in the future by existing or potential terrorists.

The rapid growth of a civilian nuclear industry, increasing traffic in plutonium, enriched uranium, and radioactive waste material, the spread of nuclear technology both in the United States and abroad all increase the opportunities for terrorists to engage in some type of "nuclear action." The increased public concern with the potential terrorist threat to nuclear programs and the virtual guarantee of widespread publicity may increase the possibilities that terrorists will attempt such actions.

Since 1973, The Rand Corporation, sponsored primarily by the Defense Advanced Research Projects Agency, and also by the Department of State, has been engaged in research on the problem of international terrorism. This research, which has been under my direction, has been aimed at providing the concerned U.S. government agencies with a better understanding of terrorist tactics, trends, and potentialities.

* Testimony given before the Committee on Energy and Diminishing Materials of the California State Assembly, November 19, 1975. The Committee's Hearings were generated by the California Nuclear Power Plant Initiative. On November 18 and 19, the Committee dealt with the issue of power plant security and special nuclear materials safeguards. The full-length paper from which this testimony was derived is being published by the California Seminar on Foreign Policy and Arms Control for release in January 1976.

In July of this year, we were contracted by Sandia Laboratories in New Mexico to undertake a proposed two-year study to examine the potential malevolent threat to U.S. nuclear programs. We will focus our attention on the attributes of potential adversaries, including their possible motivations, economic resources, knowledge, technical expertise, armament, and equipment. We will try to describe a range of representative threats and consider the relative likelihood of them. This study will, hopefully, contribute to the design, development, and application of techniques to protect nuclear materials from theft and diversion and to prevent sabotage of nuclear facilities.

Before going on, however, I would like you to understand that the views expressed in my testimony and in the paper which has already been given to the members of the committee are my own. They should not be interpreted as reflecting the views of my colleagues, The Rand Corporation itself, or any of its research sponsors.

In my view, the potential nuclear threat posed by "terrorists" encompasses a broad spectrum of mischievous to malevolent actions, including the creation of potentially alarming hoaxes, acts of low-level symbolic sabotage, the occupation or seizure of nuclear facilities, acts of serious sabotage aimed at causing widespread casualties and damage, thefts of nuclear material, armed attacks on nuclear weapons storage sites, thefts of nuclear weapons, the dispersal of radioactive contaminants, the manufacture of homemade nuclear weapons, and the detonation or threatened detonation of such devices. Acts aimed at causing thousands or tens of thousands of casualties, for a variety of reasons, may be the least likely.

The spectrum of potential perpetrators is equally diverse. It may include common criminals, disgruntled employees, eco-guerrillas, and political extremists among whom there may be anarchists, leftists, racists, rightists or separatists, or simply authentic lunatics. Their motives may be personal or collective. Their objectives may include, but are not limited to, publicity, sabotage, extortion, causing widespread damage and casualties, or possibly discrediting the nuclear industry by demonstrating that current security measures are inadequate.

It is extremely difficult to assess with any degree of confidence the potential nuclear threat posed by terrorists. Fortunately, we do not have a large number of cases to examine. A few nuclear hoaxes and a handful of incidents involving contamination with radioactive material or sabotage of nuclear facilities represent the range of our practical experience. Outside of scenarios written by concerned scientists and imaginative novelists, there have been no actual attempts -- insofar as we know -- to overtly seize a shipment of plutonium or a nuclear weapon, or to assemble and detonate a nuclear bomb. Barring the occurrence of further nuclear incidents, we are compelled to make some breathtaking inferential leaps, projecting the observations and conclusions we can now make regarding terrorism and terrorists into a new environment of an expanding nuclear industry and growing public (and publicized) concern about its safety.

This type of forecasting is hazardous. The resultant predictions must be viewed as highly conjectural, tentative, and quite possibly dead wrong. The possibility that some madman would somehow acquire and use weapons of mass destruction is by no means a new concern. But it has not

happened yet (and it is interesting to ask why). On the other hand, it is difficult to recall any predictions ten years ago that airline hijacking would suddenly become a major problem of international proportions requiring enormous expenditures for airport security and the rigorous searches of baggage and person that we have become so accustomed to when boarding an aircraft. With these caveats in mind, let me offer the following hunches:

In my view, the primary attraction to terrorists in going nuclear is not necessarily the fact that nuclear weapons would enable terrorists to cause mass casualties, but rather the fact that almost any terrorist action associated with the words "atomic" or "nuclear" automatically generates fear in the mind of the public.

There is a great deal of popular mythology about terrorists. They are frequently described as mindless, irrational killers. But terrorism for the most part is not mindless violence. Terrorism is a campaign of violence designed to inspire fear, to create an atmosphere of alarm which causes people to exaggerate the strength and importance of the terrorist movement. Since most terrorist groups are small and have few resources, the violence they carry out must be deliberately shocking. Even apparently indiscriminate violence is based on the terrible logic that indiscriminate violence gets the most attention and is the most alarming. Terrorism is violence for effect. Terrorists choreograph violence to achieve maximum publicity. Terrorism is theater.

Incidents in which terrorists have deliberately tried to kill large numbers of people or cause widespread damage are relatively rare. Terrorists want a lot of people watching, not a lot of people dead -- which may

explain why, apart from the technical difficulties involved, they have not already used chemical or bacteriological weapons, or conventional explosives in ways that would produce mass casualties. Mass casualties simply may not serve the terrorists' goals and could alienate the population. You don't poison the city's water supply in the name of the popular front.

Drawing attention to themselves and their causes, creating alarm, and thereby gaining some political leverage -- which have been typical objectives of terrorists -- may be achieved by undertaking relatively unsophisticated actions. These would be at the lower end of a spectrum of conceivable terrorist actions involving nuclear material or facilities. That is, they would do those things that demand less technical skill and risk on their part and also happen to be less dangerous to public safety, instead of attempting some of the more complex operations which potentially could endanger tens of thousands of people.

Nuclear power, whether in the form of peaceful energy or weapons, is the most potent and, to many people, the most sinister force known to mankind. Any sort of nuclear action by terrorists would be assured of widespread publicity. It would instill fear and create alarm. Almost anyone who is believed to have a nuclear device or who has gained possession of a nuclear facility is a successful terrorist.

Terrorists may try to take advantage of the fear that the word "nuclear" generates without taking the risks or making the investment necessary to steal plutonium and build a working atomic bomb. A well-publicized hoax could be as alarming as actual possession of a real weapon, provided people have no way of knowing that it is a hoax. A well-publicized terrorist attack on a civilian nuclear facility, even if the terrorists failed in their intended mission, could be almost as

alarming to the world as a terrorist success. Thus, anything nuclear could, in the terrorists' plan, be little more than a dramatic backdrop or prop that guarantees them worldwide attention.

While we cannot rule out the possibility of a "large-scale Lod," or holding a city for ransom with a nuclear weapon, the assembly and detonation of a nuclear bomb appears to be the least likely terrorist threat.

Scenarios involving the deliberate dispersal of toxic radioactive material which could cause a number of immediate deaths, a greater number of serious and protracted illnesses, a statistical rise in the mortality rate, and ultimately an increase in the number of birth defects among the affected population do not appear to fit the pattern of any terrorist actions carried out thus far.

Terrorist actions have tended to be aimed at producing immediate dramatic effects, a handful of violent deaths -- not lingering illness, and certainly not a population of terminally ill, vengeance-seeking victims. Terrorists kill a number of people and that is the end of the episode. However, if terrorists were to employ radioactive contaminants, they could not halt the continuing effects of their act, not even long after they may have achieved their ultimate political objectives. It has not been the style of terrorists to kill hundreds or thousands. To make hundreds or thousands of persons terminally ill would be even more out of character.

Large, well-organized terrorist groups which might have the resources to undertake more serious nuclear actions such as the manufacture of a nuclear weapon are likely to be more constrained by fears of polluting their cause, of alienating their constituency, and of provoking reprisals.

The same constraints do not apply when talking about small bands of extremists with anarchistic or nihilistic ideologies, and without large constituencies. In the name of some vague objective -- the launching of a simultaneous worldwide revolution, the creation of a new world on the ashes of the old, the ignition of a race war, the creation of a master race (of survivors) -- it is conceivable that a small band of conspirators might entertain the notion of carrying out some extreme act of violence based upon the possession of nuclear material or weapons. Substituting universal appeals for the lack of any real support, such a group would not necessarily be constrained by fears of alienating world opinion. On the other hand, those most willing to undertake acts which may cause widespread death and destruction may be the least able to do so. For example, they would find it difficult to build an atomic bomb -- not an unsubstantial enterprise.

Ironically, among the possible employers of nuclear terrorism are anti-nuclear extremists whose primary objective would be to halt all nuclear programs. Nuclear action undertaken by foes of nuclear programs might consist of sabotage designed to delay or prevent construction of new nuclear power plants or the operation of existing ones, occupations or seizures of nuclear facilities to publicize their opposition to nuclear programs, thefts or other actions designed to demonstrate to the public that existing security measures are totally inadequate, or possibly covert actions designed to embarrass or "frame" nuclear programs for damage done. For example, a fanatical environmentalist might steal radioactive waste material and use it to secretly pollute a waterway, then blame the contamination on a nearby reactor. Several incidents have already occurred in which the perpetrators were known or suspected to be foes of nuclear power.

On the other hand, actions which could endanger human lives or the environment are not likely to appeal to groups whose primary concern is the environment. The individual who is willing to use nuclear material to kill hundreds of people in order to make the point that nuclear programs are dangerous is probably an authentic lunatic.

In sum, the spread of nuclear technology and growth in the numbers of nuclear facilities throughout the world will increase the opportunities for some type of nuclear action by terrorists. Whether or not terrorists will try to exploit these opportunities, we simply don't know. To try to assign a numerical probability to such an attempt seems futile. There is too little to go on. Sticking a number on the possible occurrence of an act of terrorism involving nuclear facilities or material does not increase our understanding of the potential threat and may serve only to provide a false sense of predictability where none exists.

We should not exaggerate the threat. I have tried to point out why some of the more extreme nuclear actions, the horrendous scenarios in which hundreds or thousands of lives might be imperiled, appear less likely. Of course the consequences of any single such incident, if it were to occur, could be so tremendous that adequate measures must be taken to prevent it. In focusing our attention exclusively on these truly frightening possibilities, however, we may tend to overlook some of the more likely, less dangerous, but just as alarming scenarios.

Terrorists may not be interested in or capable of building a nuclear bomb. The point is they don't have to. Within their range of resources and technical proficiency, they may carry out nuclear actions that will give them almost as much publicity and leverage, at less risk to themselves, and with less risk of alienation or retaliation.

As the nuclear industry expands during the next few years, I suspect we will witness a growing number of low-level nuclear incidents: nuclear hoaxes, low-level sabotage of nuclear facilities, seizures of hostages at nuclear facilities, contamination of symbolic targets with nonlethal radioactive material, perhaps a few fake devices. There will be moments of alarm, but the inconvenience and political repercussions that these incidents produce probably will exceed the actual danger to public safety.

Apart from some hoaxes, which the government and the industry would understandably like to keep quiet, incidents involving nuclear material or facilities are certain to receive extensive media coverage. One incident will inspire others, and the total number of incidents may thus increase rapidly in the same manner that airline hijackings seemed to proliferate in the late sixties, or that kidnappings of diplomats and corporate executives seemed to proliferate in the early seventies.

After several years, the number of low-level nuclear incidents may then decline, possibly because the alarm generated by these incidents conceivably might suffice to bring about the abandonment of nuclear power as a safe source of energy. Or perhaps in part because security measures and procedures capable of deterring or preventing such incidents will be developed, and in part because such incidents will become commonplace and no longer newsworthy and thus less attractive to individuals or groups merely seeking publicity.

At a far more gradual rate, the possibilities of serious nuclear incidents may increase if only because the number of nuclear facilities in the world and the amount of traffic in fissionable material will increase. These will provide increased opportunities for diversion. The

requisite technical knowledge to assemble nuclear devices will also spread. At some point in the future, the opportunity and capacity for serious nuclear terrorism could reach those willing to take advantage of it. Before then, however, more effective safeguards may be developed that will push that point indefinitely into the future.

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