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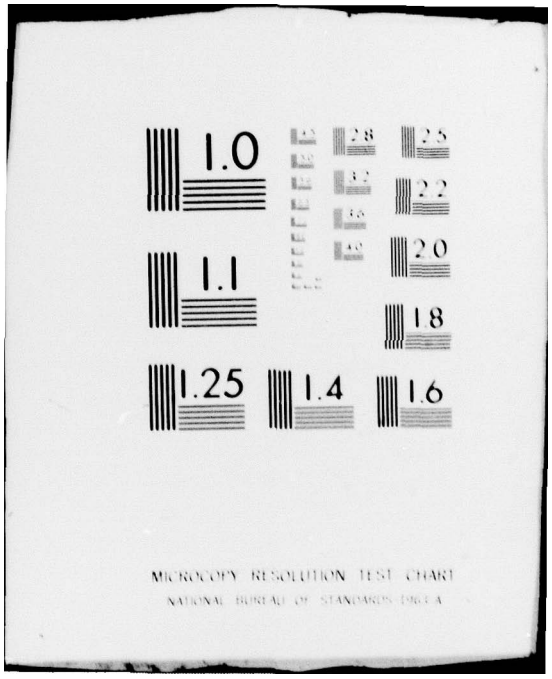
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(6) THE POTENTIAL FOR NUCLEAR TERRORISM

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THE POTENTIAL FOR NUCLEAR TERRORISM*

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The possibility that criminals, political extremists, or individual lunatics might steal a nuclear weapon from a weapons storage site, fabricate a crude nuclear explosive device using stolen nuclear material, disperse toxic radioactive material, or create alarming nuclear hoaxes has become a topic of increasing public attention and concern. Even a relatively crude improvised explosive device, if successfully detonated, could have the destructive force of several hundred tons of conventional explosives, which is thousands of times the power of the largest bombs yet detonated by terrorists. It cannot be assumed that these possibilities have been ignored by existing or potential terrorists, or that they will not be considered in the future.

The rapid growth of a civilian nuclear industry, the likelihood of increasing traffic in plutonium, enriched uranium, and radioactive waste material, the spread of nuclear technology, all increase the opportunities for criminals or terrorists to engage in some type of nuclear action. There has been considerable debate about the difficulty -- or the ease -- with which criminals or terrorists might acquire nuclear material of weapons grade, design and fabricate a nuclear explosive device, acquire and effectively disperse radioactive material, or sabotage a nuclear reactor in such a way as to cause a core meltdown and a release of radioactive material. Present safeguards and security measures are considered by many to be woefully inadequate.

The implicit assumption that criminals or terrorists would see some utility in causing casualties of the magnitude that nuclear weapons would produce or see some other peculiar advantage in going nuclear merits some

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*Text of speech given May 8, 1977, at the Conference on Nuclear Arms Proliferation and Nuclear Terrorism at the Arms Control Association, Washington, D.C.

discussion. Whether or not terrorists will go nuclear has been the subject of a growing body of literature. Some is the product of sober analysis; the popular stuff borders on or is clearly sensationalism. Among the more alarming titles are: "Is there an A-bomb in your Backyard?" "Better do as we say: This is an atom bomb and we're not fooling," and "Nuclear Hijacking: Now Within the Grasp of any Bright Lunatic." Television offerings include "When Terrorists go Nuclear," "A Do-it Yourself A-Bomb," and "The Plutonium Connection." What conclusions can we draw from the research that has been done so far?

First, it can be done. A nuclear reactor probably can be sabotaged. Whether temporarily disabled ordestroyed in such a manner that will result in a release of significant amounts of radioactive material and direct danger to the public remains an issue of debate. The notion that someone outside of government programs can design and build a crude nuclear bomb is a good deal more plausible now. In the beginning, the secrets of fission were closely guarded. However, much of the requisite technical knowledge has gradually come into the public domain. There also are a growing number of technically trained people in society who understand this material and who, without detailed knowledge of nuclear weapons design, theoretically could design and fabricate a nuclear bomb. It would involve considerable risks for the builders. Its detonation and performance would be uncertain. Its yield would be low, probably in the tenths of a kiloton range.

A former designer of nuclear weapons asserts that "under conceivable circumstances, a few persons, possibly one person working alone, who possessed about 10 kilograms of plutonium and a substantial amount of high explosive, could, within several weeks, design and build a crude fission bomb." Another expert suggests that "three to four individuals may comprise a more credible bomb-building scenario." They would need knowledge of nuclear weapons design, "a small machine shop, high explosives, some physical and technological ability, time [three to six months], space, and money." In addition, they would need "some chemical and high temperature chemistry capabilities for conversion of the SNM to a form suitable for core construction." A noted scientist, in a statement to the National Council of Churches, maintained that it was

impossible for a single person to make a bomb. "At least six persons, highly skilled in very different technologies, would be required to do so, even for a crude weapon." That may put it beyond the grasp of any "bright lunatic," but the parameters of the debate are still significantly narrow. It could be done.

For a dispersal device, the technical and material requirements are much less. Some plutonium, or a quantity of some other available radioactive material, spent fuel for example, and a mechanism for dispersal would suffice. The principal impediment to building a nuclear bomb or filling a dispersal device is acquisition of the nuclear material.

The frequent use of reflective grammar -- it could be done -- is deliberate. There is a great difference between theoretical feasibility and someone actually attempting to carry out one of the actions described.

There are political extremists and criminal groups at large today that possess or could acquire the resources necessary to carry out any of the nuclear actions I have mentioned: sabotage a reactor, steal fissionable material and build a dispersal device or possibly even a crude nuclear explosive device. Some of the larger terrorist groups who might undertake such actions with or without the assistance or complicity of a national government, and organized crime, at least theoretically, have the option of acquiring a nuclear capability. There is general consensus on this. Arguments arise not so much in the area of theoretical capabilities, but rather in the area of intentions.

The historical record provides no evidence that any criminal or terrorist group has ever made any attempt to acquire fissionable nuclear material or other radioactive material for use in an explosive or dispersal device. Apart from a few incidents of sabotage in France and one incident in Argentina, political extremists have not attacked nuclear facilities. No criminal or terrorist group has demonstrated or claimed that it possesses fissionable material. If members of any such groups have ever discussed the option of going nuclear, I know of no such report. There have been bomb threats against nuclear facilities. There have been low-level incidents involving nuclear facilities or nuclear material -- vandalism, token acts of violence, low-level

sabotage, minor thefts of nonfissionable material. There have been nuclear hoaxes most of which could easily be discarded as not credible. In sum, there is no direct historical evidence of any intentions on the part of the potential adversaries to carry out the actions of which they are theoretically capable. However, one ought to take little comfort in this fact. The lack of intelligence or of visible evidence does not mean that the option has not been discussed. Some group might move in this direction without providing clues or warning. We could first know about it when it happens.

There is, however, no inexorable linear progression that takes one easily from the currently identified spectrum of potential subnational nuclear terrorists to actual subnational nuclear terrorists, or from the nuclear incidents that have occurred thus far to nuclear actions of greater consequence. Terrorist groups, as we know them now, might be among future nuclear terrorists, but their acquisition of a nuclear capability would not be a simple escalation of what has been demonstrated in terrorist actions thus far. We can only say that terrorists have been active in the recent past, that there is an apparent increase in their technical sophistication, that they have demonstrated a degree of imagination in their choice of targets, that nuclear facilities and material theoretically could provide them with a dramatic backdrop or prop for any action, and that terrorists have shown a flair for theatrical actions. On the other hand, terrorists generally have not attacked well-guarded targets. They have generally relied on relatively simple weapons -- submachine guns and dynamite -- and the number of casualties normally associated with the detonation of even a crude nuclear device, or the dispersal of toxic radioactive material, is many times greater than the casualties that have occurred in any single terrorist incident. Terrorists have not yet gone to the limit of their existing nonnuclear capabilities. Acquiring a nuclear capability would represent a quantum jump, and upon close examination it is simply not clear what purpose taking that jump would serve.

It is an equally long conceptual jump from the present activities of organized crime to the notion of organized crime acquiring a nuclear capability. It would mean in effect that its leaders have decided to directly challenge the sovereignty of the nations in which organized crime's normal -- and highly profitable -- activities take place. This would require a fundamental change in the objectives of organized crime, whose members have sought to make money and to acquire political influence to protect their investments, but not to directly acquire political authority at higher levels or to invoke public or political reaction.

It is somewhat easier to imagine organized crime engaged in the theft of or illegal trafficking in fissionable material without seeking to acquire a nuclear capability. The annals of crime are filled with successful penetrations of well-protected targets to obtain precious commodities. For the immediate future, however, highly enriched uranium or plutonium are unlikely to be stolen for their intrinsic monetary value but rather for their strategic value as bombmaking material. They do not have the same marketability that gold or other precious metals have, and their theft is likely to be regarded in a totally different light by authorities. The loss of fissionable material probably would be viewed by government as a potential threat to the security of the nation, not simply as an economic loss. It would provoke a different level of response, perhaps applied in a state of national emergency, which could pose a serious threat to the very existence of organized crime as it now exists. It would require on the part of its leaders a change in their present goals and an acceptance of new kinds of risks.

That leaves the category of psychotic individuals operating alone usually, or occasionally in groups. Nuts are probably responsible for many of the low-level incidents and nuclear hoaxes that have occurred thus far, but most would not attempt to do something more serious than cause disruption. On the other hand, a few, if they had somehow acquired a nuclear capability, might use it. Lunatics have been the perpetrators of many known schemes of mass murder. Thus, in terms of intentions alone, psychotics are potential nuclear terrorists. In terms of capabilities, they are the farthest away from being able to

acquire a nuclear weapon. To do so would require a quantum jump in their capabilities or an environmental change that made the task much easier to accomplish.

The history of the nuclear incidents that have occurred to date provides no convincing evidence of more serious incidents -- the theft of a nuclear weapon or the detonation of a crude nuclear explosive device. Between 1969 and 1975, there were 288 recorded threats or incidents of violence at nuclear facilities in the United States; 240 of these were bomb threats; 22 were incidents of arson, attempted arson, or suspicious fires, many of them in office buildings where the Atomic Energy Commission rented space, or at university research facilities. Not included in the government's list of 288 incidents are several known cases of burglary involving nonstrategic nuclear material stolen from hospitals or research facilities. With the exception of two fires, one bombing, and an incident where a minute amount of plutonium was removed from a facility possibly by an employee, none of the incidents could be called serious, and the exceptions were serious only in terms of property damage. Public safety was not imperiled. A night watchman was wounded by a fleeing intruder, the only known casualty. The perpetrators were found or suspected to be disgruntled employees, petty thieves, foes of nuclear energy, nuts, perhaps a few political extremists.

These incidents tell us that the nuclear industry is not immune to the bomb threats that have become commonplace in all businesses and industries, nor to arson, incidents of minor sabotage, nor an occasional bombing. Pacific Gas and Electric Company and Safeway Stores fare no better.

Several more serious incidents have occurred abroad. A uranium smuggling ring was uncovered in India. A nuclear reactor under construction was briefly seized by members of a terrorist group in Argentina. There have been several costly incidents of sabotage in France during the last two years. A 40-pound bomb was planted next to a reactor in Sweden. In Austria, an individual with a history of mental insanity contaminated several train coaches with radioactive material.

As the nuclear industry expands, we can expect the number of low-level incidents -- bomb threats, pilferage, vandalism, minor sabotage -- to increase proportionately. But there is no basis for predicting escalation to more serious incidents. Whether any of the current potential nuclear terrorists will decide to actually go nuclear remains an unanswerable question. We can identify potential adversaries and describe their objectives, their capabilities, and the likely modes of operation if they decide to go nuclear, but we cannot predict with any confidence whether any will ever make that decision. This leaves a vast area of uncertainty between what "can be done" and someone deciding to do it.

At this point, the discussion becomes theological. Arguments are advanced about the inherent malevolence of man or the perfectability of social institutions. Whatever position one adopts must be accepted largely on faith for there is little direct evidence. The participants in the debate can be described in theological terms as well, for their viewpoints are not necessarily analytical, rather they are more like philosophical attitudes. There are "Apocalypticians" who subscribe to a kind of Murphy's Law of human behavior: "If something bad can be done, someone bad will do it." Given "the likely interaction of nuclear technology and the human predisposition to evil," wrote one author, ". . . it would seem that unacceptably great misuses of radioactivity cannot be prevented at acceptable cost in a world committed to fission energy." The Apocalypticians regard every incident of sabotage or theft involving any radioactive substance, however unclear in objective or minor in consequence, as evidence that more serious acts will inevitably follow. Criminals and terrorists would use nuclear means to threaten or cause mass destruction, could, and inevitably will. The Apocalypticians could turn out to be prophetic, but it is as prophets that they make their predictions.

At the opposite end of the spectrum are the disbelievers who scoff at the notion of serious nuclear terrorism. Noting the lack of serious nuclear incidents in a nuclear age now over 30 years old, they ask, "Where

is the evidence?" There are also those who concede a potential, albeit remote, threat but who are positive about the perfectability of man and his institutions, or who have a deep abiding faith that science will find a way, that a technological solution to the problems of safeguarding and protecting nuclear material will be found.

I would describe myself as a prudent agnostic. I don't know whether terrorists will go nuclear, but the consequences if they were to do so may be so serious that society cannot afford to take a chance. Prudent agnostics argue for heavy security and suggest "Go Slow" approaches to crucial decisions such as the use of plutonium.

Let me digress for a moment and offer my own speculation as to why terrorists might go nuclear. 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.

Incidents in which terrorists have deliberately tried to kill large numbers of people or cause widespread damage have been 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 biological 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.

Drawing attention to themselves and their causes, creating alarm, and thereby gaining some political leverage -- which have been typical objectives of terrorists -- could be achieved by undertaking relatively unsophisticated actions with a nuclear backdrop to add drama to the episode. Terrorists might 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 and riskier operations which potentially could endanger 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. The words "atomic" or "nuclear" recall Hiroshima, not Indian Point. 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 of making the investment necessary to steal plutonium or highly enriched uranium and build a crude 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. While we cannot rule out the possibility of 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 delayed illnesses, and ultimately a statistical rise in the mortality rate from cancer 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. 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 of persons terminally ill decades into the future would be even more out of character.

Nuclear terrorism seems more attractive as a threat than as an action. Possessing a nuclear device, it seems terrorists could demand anything. But the idea of nuclear blackmail has some weaknesses. It is not entirely

clear to me how the enormous capacity for destruction associated with a nuclear weapon could be converted into commensurate political gains. Even with a nuclear device, terrorists could not make impossible demands. They probably could not permanently alter national policy or compel other changes in national behavior; to do so would require at a minimum that they maintain the threat and it is not clear how long this could be done without discovery or betrayal. They could not create a homeland, at least not without offering the victims of the blackmail a future set of hostages to retaliate against. They probably could not persuade a government to liquidate itself. They could not realistically expect to be given more nuclear weapons by claiming or even demonstrating that they had at least one. They could not easily collect billions of dollars ransom, even if it were paid.

They could make bizarre demands but beyond notoriety, how would these relate to the achievement of the groups' goals? This pushes us to the lunatic fringe operating within a mind set totally alien to our own. Whether a large enough group composed of the people with the requisite skills for serious nuclear terrorism could be assembled to achieve utterly mad objectives, totally out of line with the means to be employed, is questionable.

The nuclear terrorists of the future may not arise from those candidates currently identified. There may appear individuals or new kinds of groups that have not yet been identified who might be more likely to use nuclear means to achieve their objectives. Threats to nuclear facilities or involving the malevolent use of nuclear materials may emerge on a different organizational or mental plane. Ten years ago, the members of the Lumb panel examining nuclear safeguards for the Atomic Energy Commission, identified "terrorists" as a potential threat to nuclear programs. They did not specify who or what they meant by the term "terrorist," and it is a little difficult to imagine today who or what they had in mind in 1967 since their report preceded the recent increase in terrorist violence. But in retrospect, their report was prophetic, for in the following decade terrorists in well-organized groups that operated internationally did become a significant problem.

They are a new entity that has emerged as a major threat in the past decade, and although they have as yet given no indication of going nuclear, they potentially could. It is difficult to say now what new entities may emerge in the coming decade.

There is always the potentiality of the mad scientist working with some extremist group or on behalf of some bizarre cause applying his or her talents to fabricate a nuclear weapon. There is the possibility that some band of fanatical foes of nuclear energy could exploit the very vulnerabilities they decry in an attempt to turn society away from nuclear power or to achieve nuclear disarmament. We could see the entry of international terrorists into the realm of traditional crime, creating new international criminal entities. We could see members of an "embargoed" nuclear industry whose aborted careers or lost fortunes drive them to nuclear actions directed against society. The stuff of novels, perhaps, definitely speculation, not prediction, but the point is that there may in the future emerge nuclear terrorists of types we have not and cannot now identify.

My final conclusion is that the origin, level, and nature of the threat may change. Some individual or group may acquire a nuclear capability and successfully carry out some scheme of extortion or destruction that will inspire imitation. The probability of a second incident occurring, especially after a "success" would seem to be greater than the probability of the first. A terrorist group with the capabilities for acquiring a nuclear capability may be placed in a desperate situation that will begin to erode the political arguments against nuclear action. The political context may change. A war may occur in which nuclear weapons are used, inviting further use by nations and subnational groups. Plutonium could become more widely and easily obtainable owing to lack of adequate safeguards. New low technology enrichment techniques could emerge, making the production of fissionable material much easier, giving more entities the capability of producing weapons material. At some point in the future, the opportunity and capacity for serious nuclear violence could reach those willing to take advantage of it. We do not know where that point is or how close we may be.