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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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USNRC

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ATOMIC SAFETY AND LICENSING BOARD

OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

Before Administrative Judges:

Charles Bechhoefer, Chairman  
Dr. Jerry R. Kline  
Dr. Peter S. Lam

Docket No. 50-160-Ren

In the Matter of

ASLBP No. 95-704-01-Ren

GEORGIA INSTITUTE OF TECHNOLOGY  
RESEARCH REACTOR  
Atlanta, Georgia  
Facility License No. R-97

GEORGIANS AGAINST NUCLEAR ENERGY (GANE) COMMENTS ON SECURITY AT THE  
GEORGIA TECH REACTOR FACILITY FOLLOWING GEORGIA TECH'S DECISION  
TO REMOVE THE REACTOR FUEL BEFORE THE 1996 OLYMPIC GAMES

GANE respectfully submits the following comments on security of the Georgia Tech reactor facility during the 1996 Olympic Games scheduled to be held in downtown Atlanta in July 1996. The Atomic Safety & Licensing Board hearing these issues has requested the parties' comments on whether GANE's contention that security is inadequate for the facility during the Games is moot following Georgia Tech's announcement that it will remove all high-enriched uranium fuel prior to the Olympic Games (during February and March 1996).

While GANE is impressed and pleased with Georgia Tech's decision which indeed improves security on the Georgia Tech campus which will house the Olympic Village for 15,000 of the world's athletes during the Games - we have contended and continue to contend that all of the radioactive materials at the Neely Nuclear Research Facility pose a security risk. Georgia Tech has also decided to remove another source with which GANE was highly concerned - a 6,000-curie cesium-137 source will be removed from the Cherry Emerson Building near the Neely

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Nuclear Research Facility before the 1996 Olympics. GANE cannot find our contention that security at the Neely Nuclear Research Facility is inadequate to be moot as long as Georgia Tech plans to retain the 250,000 curies of cobalt-60 on the site.

Attached are materials which will help the parties understand the seriousness of the situation with the cobalt-60. GANE reiterates that cobalt-60 is a highly active gamma emitting source with serious consequences to organic life that suffers exposure. Hazardous amounts of cobalt-60 are described in TRILLIONTHS of a curie. It is obvious that 250,000 curies is an awesome amount of radiation which can wreak much harm if unshielded or spread around in the environment.

GANE asks you to pay particular note to the location of the cobalt-60 within the Neely Nuclear Research Center. The cobalt-60 shielding pool is located by the outside wall of the facility which faces Atlantic Drive, directly across from where 8th Street terminates on Atlantic. The outside wall is an ordinary brick wall, approximately four inches thick. Inside the facility, the hot cell which at any given moment may house any or all of the cobalt-60 (which may also be left in the hot cell overnight and over the weekends) is located on the other side of a window of the waiting room wall. Apparently realizing that the hot cell was vulnerable, Georgia Tech later added a "wall" which is concrete blocks stacked without mortar on the other side of the window.

One terrorism scenario of which GANE has been advised is that there may be no alarms or security cameras for the roof over the hot cell and cobalt-60 shielding pool. A "smart guy" could enter the building through the roof undetected. GANE is concerned that the "smart guy" who is too smart to steal the material which would kill him quickly, would drop an explosive with a timer into the area and clear out well before the explosion which would create much harm for residents of the campus, Olympic Village, Atlanta, not too mention, the environment and real estate which would be ruined. GANE is more concerned with harm to the environment and the public health than by the bad press that Georgia Tech, Atlanta, the NRC, the FBI, the State of Georgia, et al. would receive for allowing such a preventable catastrophe to occur, but global bad press is another likely outcome of radiological sabotage during the Games.

Another scenario that has been described to GANE is of a runaway vehicle rolling down 8th Street, a steep hill that runs down into the low-lying area where the Neely Nuclear Research Center is situated, crashing through the outside wall of the Neely Nuclear Research Center

and landing in the shielding pool, causing a release of cobalt-60 into the surrounding environment. GANE has heard speculated scenarios of a casually dropped book bag full of explosives and a baby buggy packed with a fertilizer-type explosive such as was used in the Oklahoma City bombing. When you see the damage that a small truckload of explosive did to the large Federal office building in Oklahoma City, it's not too hard to picture a small explosion being able to breach the brick wall of a single-story building and widely dispersing the cobalt-60 on the other side of that wall a great distance.

GANE has also enclosed for your use in studying the severity of the situation at Georgia Tech, a report from The International Task Force on Prevention of Nuclear Terrorism which was published in the Bulletin of Atomic Scientists in 1986. This thoughtful report carries increased significance in the times following the World Trade Center bombing, Oklahoma City bombing and with the Unabomber still at large and holding the world's airports hostage. The study underscores the widely accepted theory that psychological terror is the main motive behind terrorist acts, not necessarily a body count. The idea of psychological terror as a primary motive for terrorists is also supported by a publication on terrorism **Beating International Terrorism** by Stephen Sloan (Maxwell Air Force Base, Alabama) which begins its introduction, "The modern age of terrorism was ushered in by the massacre of 11 Israeli athletes at the Olympic Games in Munich in 1972." The first subhead under chapter 1 is *Terrorism as a Psychological Weapon*. This section begins: "Since terrorism is 'directed toward the creation of a general climate of fear,' it must be stressed that terrorism is first a psychological weapon, for those who use it play on the most elemental fears. As one definition cogently notes, 'Terror is a natural phenomenon, terrorism is the conscious exploitation of it.'"

GANE believes that the cobalt-60 which is licensed by the State of Georgia as an agreement state should be placed immediately under temporary NRC jurisdiction based on the following passage from the Atomic Energy Act:

ATOMIC ENERGY ACT, Chapter 23, 42 §2021

(j) Reserve power to terminate or suspend agreements; emergency situations; State nonaction on causes of danger; authority exercisable only during emergency and commensurate with danger

(1) The Commission, upon its own initiative after reasonable notice and opportunity for hearing to the

State with which an agreement under subsection (b) of this section has become effective . . . finds that (1) such termination or suspension is required to protect the public health and safety . . .

(2) The Commission, upon its own motion or upon request of the Governor of any State, may, after notifying the Governor, temporarily suspend all or part of its agreement with the State without notice or hearing if, in the judgment of the Commission:

(A) an emergency situation exists with respect to any materials covered by such an agreement creating danger which requires immediate action to protect the health or safety of persons either within or outside the State, and

(B) the State has failed to take steps necessary to contain or eliminate the cause of the danger within a reasonable time after the situation arose.

A temporary suspension under this paragraph shall remain in effect only for such time as the emergency situation exists and shall authorize the Commission to exercise its authority only to the extent necessary to contain or eliminate the danger.

GANE interprets this passage of the Atomic Energy Act to give the NRC authority when it deems necessary to regulate a special situation which is not being appropriately regulated.

Much like the passage from Title 10 -

(f) In addition to the fixed-site requirements set forth in this section and in §73.67, the Commission may require, depending on the individual facility and site conditions, any alternate or additional measures deemed necessary to protect against radiological sabotage at nonpower reactors licensed to operate at or above a power level of 2 megawatts thermal

GANE believes that the situation with the 1996 Olympics and the history of terrorism during the Games, the recent outbreak of terrorism and the possible especial attraction of terrorists to radiological sabotage, is that special situation for which both Title

10 and the Atomic Energy Act allow the NRC special authority.

Georgia Tech uses features of the Neely Nuclear Research Center in its operation of the reactor, notably, the cobalt-60 pool is used in the fuel removal process. It may be useful to divide responsibilities and authorities to some extent, but blind adherence to artificial separations may lead to dangerous oversights and gaps in authority.

GANE notes that the Commission, during its consideration of Georgia Tech's and the NRC Staff's appeal of the Board decision to admit GANE's security contention, requested an inventory of nuclear materials from Georgia Tech. It was following this request for information from the Commission that Georgia Tech announced it would remove all reactor fuel prior to the Olympics. GANE notes that no inventory of nuclear materials has yet been submitted to the Commission or the Atomic Safety & Licensing Board by Georgia Tech. GANE considers the Commission's interest in a complete inventory healthy given the great risk posed by large inventories of radioactive materials in a large population center on the threshold of hosting an event of global significance.

The reactor is not the only feature of Georgia Tech's nuclear program which poses a security threat. And the actual Olympics is not the only time when the threat of radiological sabotage would be heightened. The psychology of terrorism could be in place well before the Games, possibly influencing other nationalities' sense of security and willingness to participate in the Games or to trust the ability and concern of the United States to make their citizens safe.

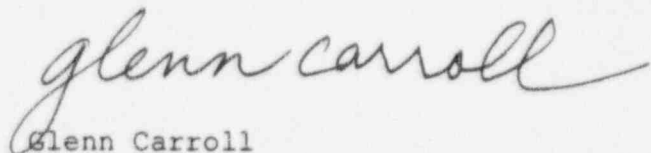
Since Georgia Tech has decided to remove the cesium-137 and the complete assortment of reactor fuels, the only remaining radiological threat with which GANE is concerned is the inventory of cobalt-60. It is the opinion of GANE that the only sure way to protect Atlanta from the cobalt-60 is to remove it from the site altogether. We do not believe that removal of the cobalt-60 will be as elaborate as removal of the reactor fuel, but we expect that it will take some time to arrange for a home for it and that the packaging will require painstaking process, so we beg for a decision immediately, that the removal work may begin. GANE believes that all the cobalt-60 may not fit into a single standard cask. Since Georgia Tech has not fully embraced the entire task before it that will be required to ensure removal of the threat of radiological sabotage from the Olympic Games, coupled with the fact that none of the current personnel at the Georgia Tech nuclear program have experience with the delicate process of removing the spent fuel from the reactor, it is imperative that Georgia Tech receive its mandate quickly and begin the real work of

removing the dangerous materials.

The fuel removal process involves the cobalt-60 pool, so it is wise to consider all the materials to be removed in one coordinated plan. GANE encourages the Commission to take its authority from the State of Georgia which has been unresponsive to GANE's concerns with the materials it regulates when it is clear that a special security risk exists because of the Olympics. It is apparent that there is concern with security at the State level that existed prior to GANE's awareness of, or public involvement with, the security risk posed by the cobalt-60. It is also apparent following GANE's effort to work with the State of Georgia on resolving this problem, that there are political barriers within the Georgia Radiation Division which may completely disable Georgia from dealing properly with this security threat. Since the threat from terrorism is imminent and increases as the start of the 1996 Olympic Games approaches an emergency situation now exists with the cobalt-60 and the NRC should step into its authority immediately.

GANE has appreciated the democratic process which has facilitated our bringing these important issues before the authorities in a position to take action. We fervently hope that we can stick to the important issue of protecting the public health from an unsafe situation such as the cobalt-60 poses by its location in downtown Atlanta. We all must do our part to make the world better for our having lived, and it is within our reach to protect the public from needless harm, while providing the nuclear students and staff at Georgia Tech with a wonderful education in the nuclear industry's most pressing need - the need to properly containerize, and sometimes to transport, extremely hazardous materials. We look forward to the day when GANE, Georgia Tech and the NRC all shake hands and say, mutually, "Good work, ya'll!"

Sincerely,



Glenn Carroll

Representative for GANE

Dated and signed August 31, 1995  
in Decatur, Georgia

NEELY NUCLEAR RESEARCH CENTER AT GEORGIA TECH

900 ATLANTIC DRIVE

RADIOACTIVE INVENTORY (APPROXIMATE)

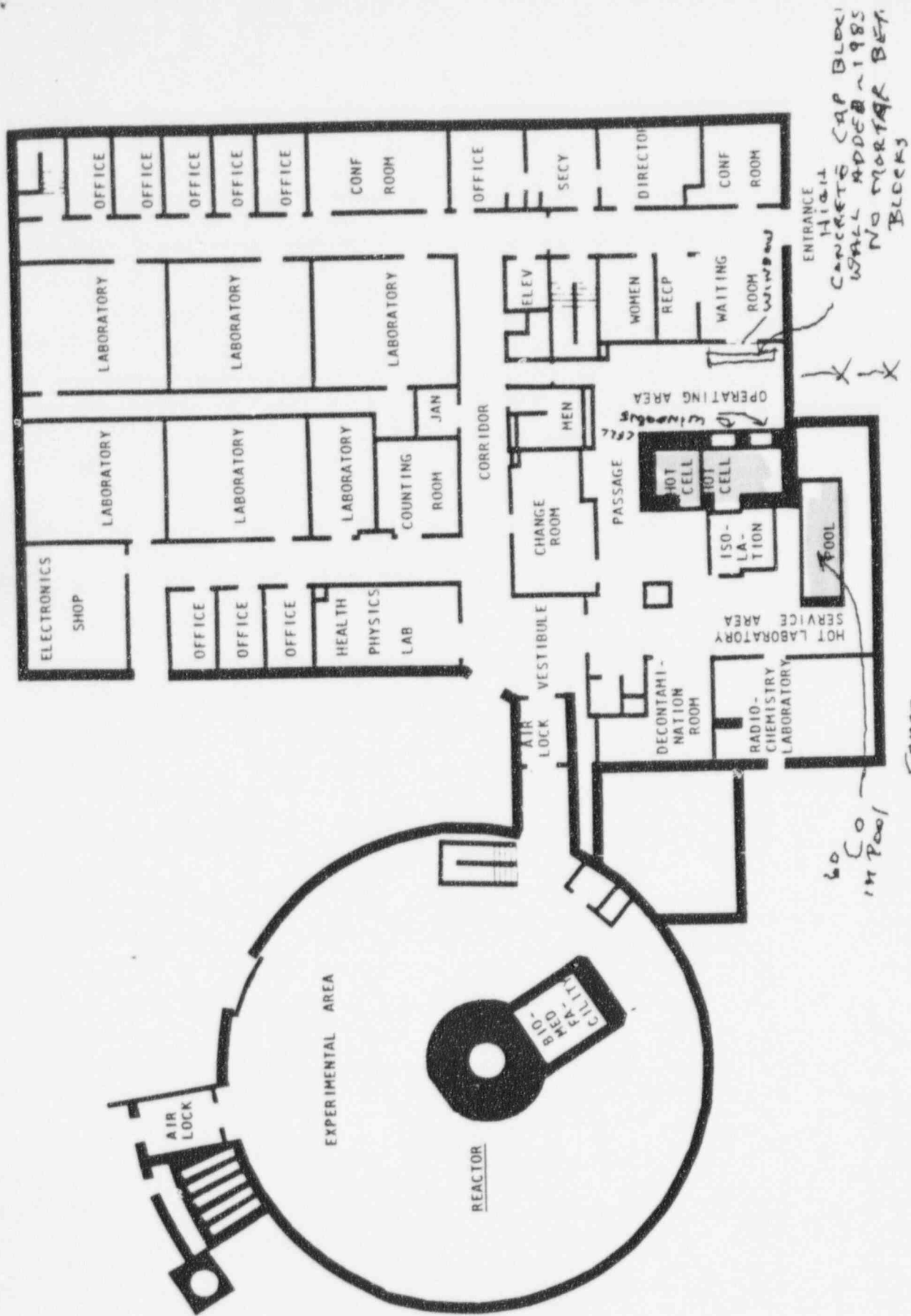
COBALT 60

approx. 250,000 curies

- 75-80 sources. Some are in wafers, the size of a nickle, stacked in a tube about 12" long. Some are flat (like bacon), approx 10" X 18"
- All are "doubly encapsulated." The cobalt arrived from the Savannah River Project encapsulated in aluminum. At Georgia Tech they were then welded over with stainless steel. However, welds were never checked or certified by the American Standard Institute. Strong possibility they could rupture.
- Stored in open pool, approx. 20' deep X 30' long X 6-8' long. Pool is a few feet away from outside wall of building (concrete block with brick facade), approx. 40' from Atlantic Drive.
- If sources were ruptured, very hot particulate matter would give off deadly radiation. Non-soluable particles would lodge in body.
- Cobalt sources are used in adjacent "hot cells."
- Cobalt in pool and in hot cells are extremely vulnerable to terrorism.
- Cobalt is regulated by the state DNR, Environmental Protection Division.

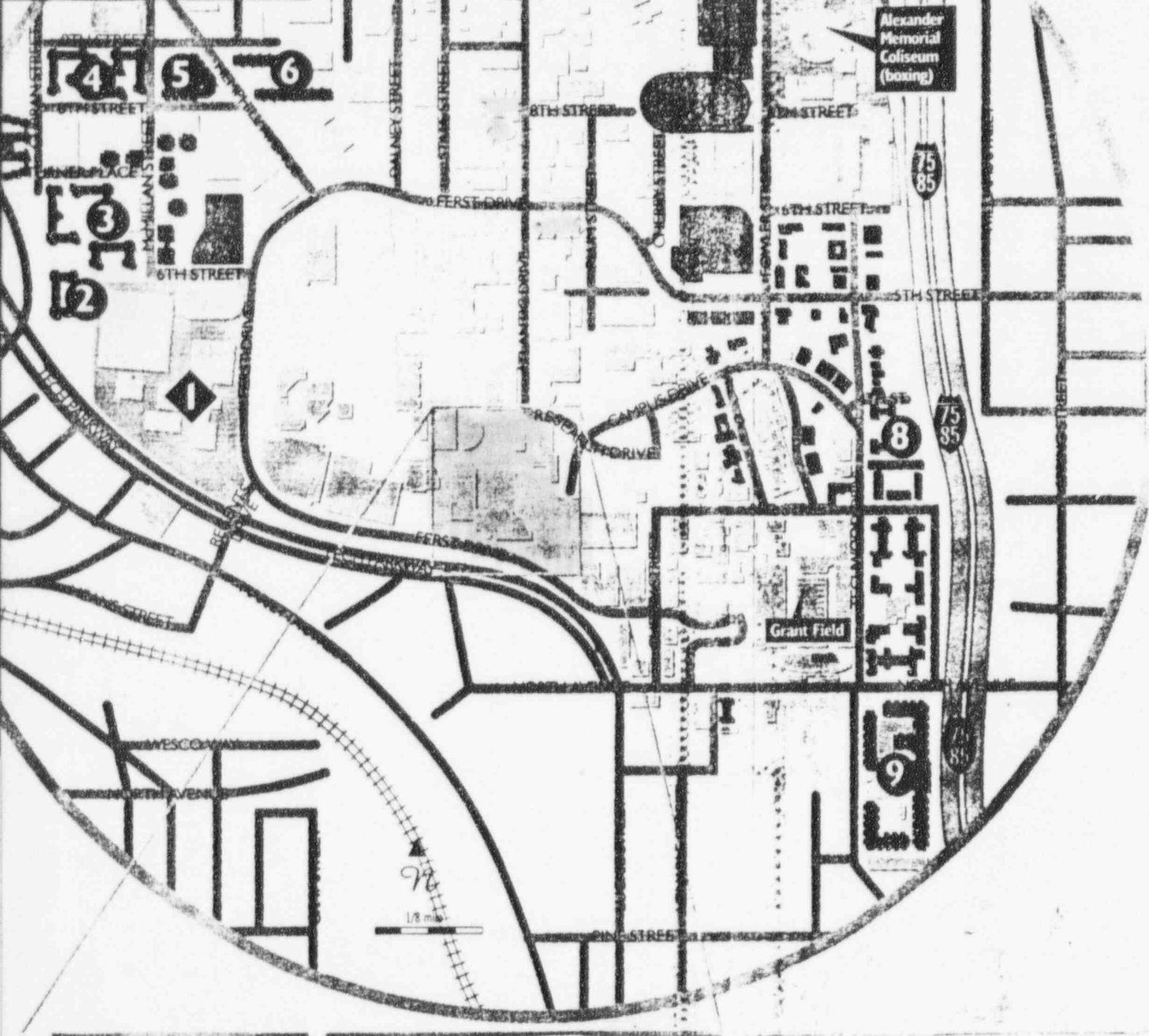






X FENCE X ATLANTIC DRIVE  
 Figure 4.4. Nuclear Research Center First Floor Plan.

- Existing housing
- New housing
- Festival/international zone
- Sports competition venue
- Training sites



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# Report on nuclear terrorism

*The International Task Force on Prevention of Nuclear Terrorism, the first independent group to deal exclusively with the question of nuclear terrorism, was formed in 1985 by the Nuclear Control Institute, a Washington-based organization concerned with nuclear proliferation problems. The Task Force and the earlier conference out of which it grew were cosponsored by the Institute for Studies in International Terrorism of the State University of New York.*

*While the Task Force "recognizes there is an element of risk in drawing public attention to the possible means of nuclear terrorism," it "considers the far greater risk to be in leaving basic concerns unspoken and needed improvements undone." The report of the Task Force is a consensus document in which all members do not necessarily agree on every point and all wordings, but in each case a substantial majority of the members do agree.*

*The following are two introductory sections of the Task Force's report, a summary of its recommendations, and a list of its members. The report and some 26 background papers that were commissioned for use of the Task Force will be published next year by Lexington Books.*

## Defining the threat

At the beginning of the fifth decade of the nuclear age, three overriding imperatives dominate efforts to exploit and control the energy of the atom:

- prevention of nuclear war between the superpowers;
- prevention of the further spread of nuclear weapons;
- prevention of catastrophic nuclear accidents.

Now there is a fourth imperative: prevention of nuclear terrorism—nuclear violence by subnational groups—which should be seen as having an important bearing on the other three. The public has given little serious attention to the possibility of nuclear terrorism, while policy makers devote considerably more attention and resources to the other three imperatives. Yet, the fact that so far there has been no serious act of nuclear terrorism is no reason for complacency.

Terrorists could "go nuclear" in a variety of ways. The most important of these are stealing a bomb, stealing nuclear materials suitable for weapons and building a bomb with these materials, sabotaging or holding for ransom a reactor or other nuclear facility or a shipment of reactor fuel or waste, or by credibly claiming to have acquired a weapon or nuclear material for building a bomb or a dispersal device. Each of these would constitute a form of nuclear violence, actual or threatened, against society.

Terrorists might be more willing than nations to use acquired nuclear weapons. Deterrence may not work against terrorists who go to the lengths of "going nuclear." In this sense, nuclear terrorism could be the most dangerous

variant of nuclear proliferation and non-nuclear terrorism. While the probability of nuclear terrorism remains low, the consequences for urban and industrial societies could be catastrophic. An explosion would breach the critical post-war moratorium on use of nuclear weapons; in a worst-case situation it conceivably could spark an inadvertent nuclear exchange between the superpowers. Thus, the potential for nuclear terrorism poses an exceptional global danger.

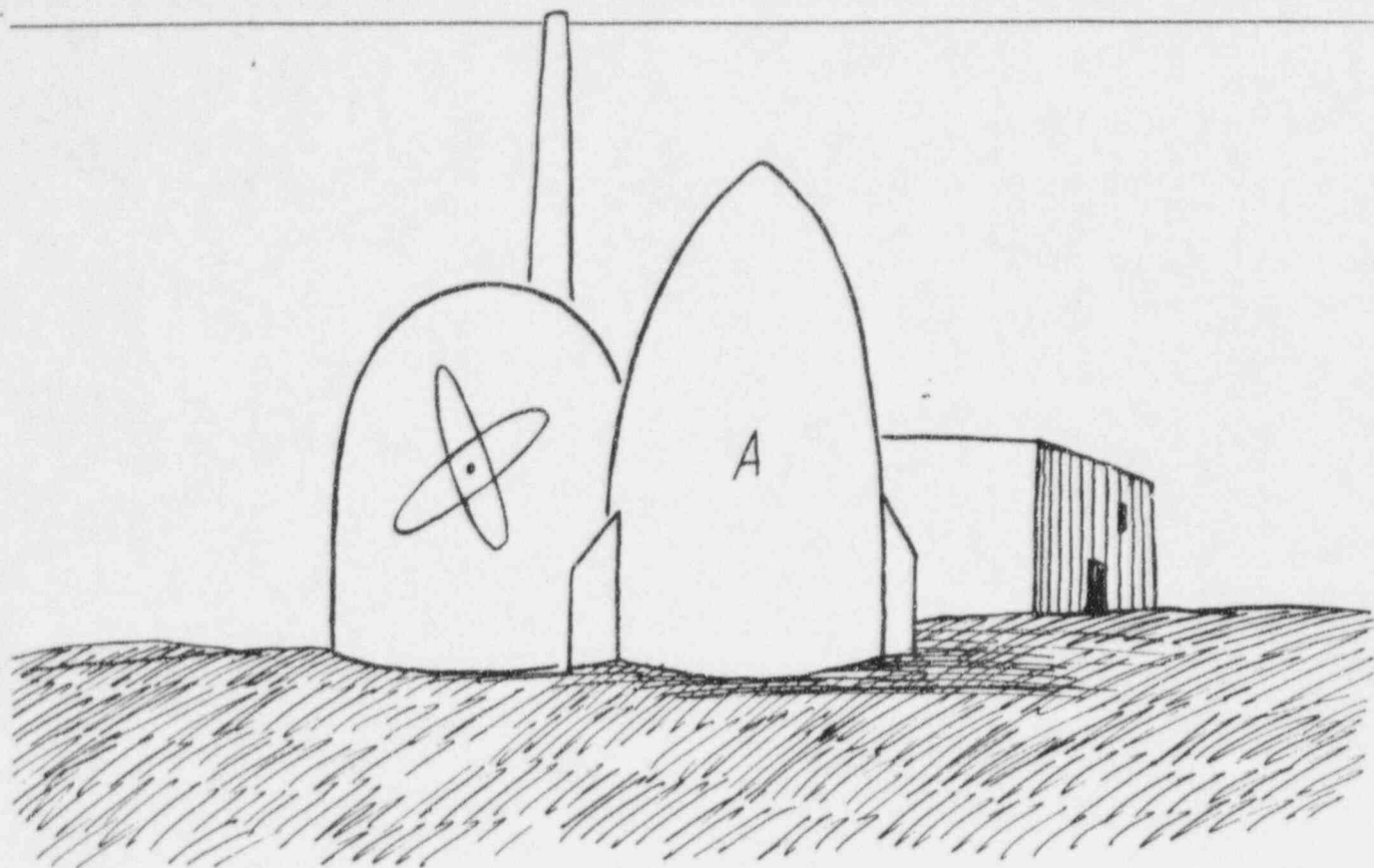
In the judgment of the Task Force the probability of nuclear terrorism is increasing. This is due to a confluence of factors:

- the growing incidence, sophistication, and lethality of conventional forms of terrorism, often to increase shock value;
- apparent evidence of state support, even sponsorship, of terrorist groups;
- the storing and deploying of nuclear weapons in areas of intense terrorist activity;
- an increasing number of potential targets in civil nuclear programs—in particular facilities and shipments in which plutonium and uranium, in forms suitable for use in weapons, are present;
- potential black and gray markets in nuclear equipment and materials.

While as yet there are no public signs that any terrorists have the essential combination of capability and will to engage in an act of nuclear violence, the psychological and political impact of a successful terrorist nuclear threat might well be exceptional. A plausible threat or hoax involving a nuclear device or sabotage could have enormous coercive and disruptive results without mass killing or destruction; indeed, we believe this may be the most likely form of nuclear terrorism at this time.

Given the widespread deployment of tactical nuclear weapons, the continuing spread of weapon-usable forms of nuclear materials, and the availability of know-how applicable to assembling fission weapons, the interest of terrorists and, as the case may be, their sponsors in acquiring nuclear weapons should be regarded as technically, politically, and psychologically plausible. There have been published reports of one terrorist group in Europe having tried unsuccessfully to obtain information on NATO nuclear-weapons storage facilities, and of another having sought unsuccessfully to enlist the help of a nuclear scientist regarding nuclear weapons they considered stealing. One national leader, regarded as being engaged in sponsoring terrorism, is reported to have sought unsuccessfully to buy nuclear weapons while pursuing a nuclear research program that could be applied in the long term to making bombs.

Causing or threatening to cause a serious nuclear accident is another potential avenue of nuclear terrorism that should be taken seriously. Indeed, according to data made available



Paul Valery, West Germany

to the Task Force, some 155 bombings, other attacks, and violent demonstrations have taken place at the sites of civil nuclear installations, mostly power reactors in Europe and the United States, over the past 20 years. None has caused a serious accident. Most have been the work of nuclear protesters and disaffected employees rather than terrorists. Yet, a reactor accident brought about by terrorists, even one releasing significant amounts of radioactivity, is by no means implausible and is technically feasible.

The Task Force recognizes that there is an element of risk in drawing public attention to the possible means of nuclear terrorism, but we consider the far greater risk to be in leaving basic concerns unspoken and needed improvements undone. Opportunities for nuclear terrorism are likely to be known to sophisticated terrorist organizations and to their state sponsors. The public should understand the nature of the threat. It will then be in a position to decide on protective steps we believe should be taken promptly and the more difficult institutional improvements and international arrangements we believe should be pursued over the long term. The near-term improvements are feasible and not overly expensive, at least when viewed in national security terms.

If governments take additional measures now, they may prevent nuclear terrorism before it materializes and will be ready to respond in the event it materializes. The role of the media in providing accurate information and dispelling undue fears during the course of a nuclear terrorist incident is especially crucial. The Task Force report and supporting

documents are intended to increase public understanding of the risks of and the possible countermeasures against nuclear terrorism without providing sensitive details that could prove useful to would-be perpetrators.

The Task Force, for example, has determined that building a crude nuclear device, although more difficult than previously suggested by some experts, is within reach of terrorists having sufficient resources to recruit a team of three or four technically qualified specialists. The team need not have previous experience in building weapons, but would need chemical high explosives and a sufficient quantity of weapon-usable nuclear material, most probably in metallic form. A special study prepared for the Task Force by a team of former U.S. weapons designers has established that crude nuclear bomb making, while not as simple as once supposed, can be accomplished with a sufficient quantity of reactor-grade plutonium (the kind separated by industry in some countries from the spent fuel of a power reactor) or highly enriched uranium (the kind used to fuel many research reactors) in metallic or possibly even in oxide form. Previously, some analysts of this problem believed that a group gaining entry to a civil nuclear fuel fabrication plant could fashion a crude bomb on site simply by wrapping some high explosive around a "coffee can" containing a few kilograms of plutonium oxide powder and then detonating the contraption to obtain a nuclear yield equivalent to hundreds, even thousands, of tons of TNT. The study found that such a "coffee-can bomb" is not feasible although the use of oxide in a crude nuclear device is possible.

ble in a substantially larger amount—at least many tens of kilograms. This information is essential to devising precautions, restraints, and controls that are adequate to insure that terrorists do not acquire significant quantities of weapon-usable nuclear materials.

At the same time, the Task Force has concluded that nuclear terrorism is a threat requiring, in addition to technical strategies, an array of political and legal approaches that should be pursued with due recognition of established international norms. Several approaches explored by the Task Force are intended to reduce the threat or to cope with the consequences directly—such as those dealing with physical protection, intelligence, and emergency management. Other approaches are deemed by a number of the Task Force members to be of more limited utility but nevertheless useful by addressing the threat indirectly and thereby influencing the climate conducive to nuclear terrorism. Some of the Task Force members assign essential importance to these other approaches: strengthening international law, addressing underlying causes of terrorism, and pursuing arms control.

The Task Force agrees that in order to uphold the international consensus needed for the fight against nuclear terrorism, nations should adhere rigorously to their own obligations under international law as they rightly condemn terrorists for their violations of international law.

It is beyond the mandate of the Task Force to explore in depth the causes of terrorism generally, including possible nuclear terrorism. We recognize, however, that terrorism often thrives in an environment where prevailing political, economic, and social conditions create anger and despair among social, ethnic, religious, or national populations. These conditions serve as a source of popular support for terrorist causes and of fresh recruitment for terrorist groups. Obviously, addressing grievances will not affect the dedication and resolve of the most radical terrorists whose objective is to destroy the prevailing order. On the other hand, we believe it necessary for governments to address underlying political, economic, and social conditions to the extent possible. This might help dry up fertile ground for terrorists and thereby deprive them of popular support and their recruitment base. There is little prospect of ending terrorism in the short term. Several forms of nuclear terrorism, however, pose demanding tasks to terrorist groups which could be helped greatly by a broad support base. Thus, the denial of this base is important for containing the threat of nuclear terrorism in the long term.

All nations, in striving to deny terrorists nuclear arms, should pursue arms control efforts to help limit the growth and the spread of nuclear arsenals. Our recommendations on a number of relevant arms control measures will be found further in the report.

Finally, the Task Force emphasizes that much can be done to reduce the dangers; the current situation does not call for hopelessness or despair. Nuclear terrorism is possible, but not necessarily imminent or inevitable. There is, in fact, some basis for optimism. Obstacles to nuclear terrorism



Paul Valery, West Germany

exist, and these no doubt help to explain why no terrorists, operating either independently or with state backing, are known to have attempted major acts of nuclear violence. The disincentives for engaging in such heinous acts are still high. In a number of nations, we find that protection of the civil and military nuclear sectors has been improved in recent years. We also find that the push to plutonium fuel in power programs has not proceeded as quickly as projected only a few years ago. Widespread commercial trade in plutonium would require improved controls against terrorism. Due to the adverse economics of using plutonium as an energy source over the next several decades, there is a window of opportunity to develop improved controls against nuclear terrorism if commercial uses are deferred until then. In the meantime, weapon-usable forms of uranium are beginning to be phased out of civilian research reactors, especially on university campuses where such fuel is most vulnerable.

Certain paths to bomb making, particularly the seizing and reprocessing of spent fuel, are more difficult and dangerous than popularly supposed. Indeed, sabotage of properly casked spent-fuel shipments is likely to pose little risk except to the perpetrators. Nuclear power plants are designed to resist rocket attack from afar and to shut down safely if powerlines to or from the plant are cut. And the risk that nuclear terrorists could trigger inadvertent nuclear war is being reduced substantially by ongoing diplomatic

and technical cooperation between the superpowers. The challenge is for governments and industry to build on the foundation of these technical, organizational, and political strengths to more effectively counter the threat of nuclear terrorism. Effective measures are available and should be taken to minimize risks of nuclear terrorism without jeopardizing development of nuclear energy for peaceful purposes.

[Task Force member Inga Thorsson wishes to add the following personal view: No serious discussion of the threat of nuclear terrorism can disregard the most decisive threat to our survival: the existence of nuclear weapons. The threat of nuclear terrorism is due to this fundamental fact and to the production of electrical power by nuclear reactors. Consequently, and aware as I am that knowledge of evil—in this case, the splitting of the atom—can never be taken away from mankind, the political renunciation of nuclear weapons and nuclear-produced electric power is a prerequisite to removal of the nuclear terrorist threat. In the final analysis, all states possessing nuclear weapons are nuclear terrorists, keeping the peoples of the world hostages to their political aims, to be achieved, if necessary, by the use or the threat of use of nuclear weapons.]

### Establishing priorities

The Task Force has established an order of priorities as a guide to policy makers and the public for countering the threat of nuclear terrorism. It is based on three basic considerations: the gravity of the consequences, the vulnerability of potential targets, and the nature of the adversary.

*Gravity of the consequences.* Theft and explosion of a nuclear weapon would likely have the most catastrophic consequences; indeed, the theft and threat of use in and of itself could have severe political and psychological consequences. Accordingly, the highest priority should be given to protecting nuclear weapons against theft, preventing the detonation of nuclear weapons in the event they are stolen, and recovering stolen weapons. Improvements are needed in all three areas, as detailed later in the report.

Theft of nuclear materials and their use or threatened use in a crude homemade bomb—or, with help from a state, in a more sophisticated device—is the second most dangerous possibility. Interest in protecting civil and military nuclear materials from theft and, at least for the time being, in minimizing production and use of materials in weapon-usable form should be correspondingly high.

Sabotage or threatened sabotage of a reactor, fuel facility, or fuel shipment is the third most dangerous possibility. A nuclear explosion resulting from such sabotage is all but excluded, but potential contamination to the surrounding area could be severe, depending on weather conditions at the time, on the ability of terrorists to deactivate or circumvent fall-back safety mechanisms, and on the ability of building structures and shipping containers successfully to withstand the consequences and to prevent dispersal of radioactive materials.

*Relative vulnerability.* In general, civil nuclear installations and shipments worldwide have been more vulnerable than those in the military sector of countries where nuclear weapons are produced, stored, and deployed. However, there may well be exceptions. Limited resources and the more severe social and legal constraints in the private sector of democratic states result in the guard forces, barriers, exclusion zones, and equipment being generally of a lesser order than those used to protect weapons and military installations and shipments. In particular, civil nuclear materials suitable for use in nuclear weapons are not necessarily given the same level of protection worldwide as is accorded to weapon materials and to weapons themselves.

The nuclear weapons sector is generally less vulnerable worldwide, given the substantial resources already applied to protective measures. Yet, political and budgetary factors serve unduly to inhibit the upgrading of protective measures needed to counter the terrorist threat against potential military nuclear targets. In particular, upgrading the protection of nuclear weapons deployed in Europe and in the Pacific region, especially in countries where terrorism is intense, is not proceeding as rapidly as feasible, and military production reactors in the United States do not have the costly containment structures required for commercial nuclear power plants.

*Nature of the adversary.* Mass hysteria and social disruption arising from a credible nuclear threat or hoax, rather than mass killing and destruction resulting from a nuclear detonation or sabotage, may be the objective of a group attempting nuclear terrorism. Indeed, most terrorists operating within their own borders would be inhibited from engaging in actual nuclear violence out of fear of losing popular support for their cause. However, a single successful theft of a weapon or of weapon-usable material or a successful penetration of a nuclear-weapons site or a nuclear reactor would cause severe social, psychological, and political disruption—an objective common to most terrorists.

The growth of terrorism across borders poses a special problem because the perpetrators may not be inhibited from committing nuclear violence against foreign populations. The self-image of some terrorists as being at war with a superpower or a military alliance could create incentives for a "counterforce" nuclear strike against military installations in which civilian casualties would be regarded as deplorable but unavoidable "collateral damage." For example, a number of NATO installations are far enough from population centers to permit a terrorist nuclear strike with a low-yield device with relatively few civilian casualties.

A further consideration is whether terrorists operating across borders are operating independently or with state support. One view among experts is that the latter are likely to have a greater capability and fewer inhibitions. U.S. Secretary of State George Shultz, in a speech to the National Defense University, declared: "State support will probably be the single most important factor in enabling terrorists to acquire [advanced] weapons, which may well include nuclear devices." But some analysts regard the vulnerabili-

ty of states to retaliation as a major deterrent to state sponsorship of nuclear terrorism and regard all but perhaps the most fanatical regimes as likely to be so inhibited.

A terrorist group's place in the political spectrum is sometimes seen as being significant in assessing its potential for nuclear violence. Some observers maintain that terrorists of the "left" tend to regard their cause as designed to better the human condition and thus generally avoid mass casualties, while terrorists of the "right" tend to be more contemptuous of the masses and are more prone to acts that take relatively large numbers of lives. However, there is an increasing pattern of random killing among terrorists of all political persuasions that tends to invalidate this distinction.

Paradoxically, some analysts believe that if counterterrorism efforts prove generally successful, these efforts could contribute to the risk of nuclear terrorism. A heightened "war" against terrorism might lead to an escalation of terrorist violence. According to this view, terrorists often see themselves "on the defensive," a self-fulfilling image that is confirmed by ever harsher responses to their violent acts. It is also regarded as conceivable that a terrorist group, finding itself in a deadlock situation, blocked in its efforts and no longer able to capture headlines, and believing that its very existence is threatened, could resort to nuclear terrorism on the basis of having "nothing to lose" and needing a "terrorism spectacular" to regain its prominence.

The final consideration is whether terrorists are likely to have the combination of motivation and capability needed to engage in nuclear violence. There are a number of options for escalating violence before they approach a nuclear threshold. Nuclear systems are but one among the high-technology options available to terrorists. Chemical and biological systems, for example, offer terrorists effective methods of threatening to kill or actually killing large numbers of people. Further, it is difficult to think of a demand that could be used to justify an act of nuclear violence. For these reasons, some analysts discount the possibility of nuclear terrorism or forecast an increasing number of highly plausible nuclear hoaxes. At the same time, as noted above, acts of nuclear sabotage and theft and the technical resources needed for construction of a crude nuclear device are within reach of modern terrorist groups with sufficient resources. Nuclear terrorism, although it may appear improbable, should not be discounted or dismissed. It should be seen as a real threat to civilization. □

## International task force on prevention of nuclear terrorism

### Co-chairmen:

Rear Adm. Thomas Davies, USN (Ret.), former assistant director for nonproliferation, U.S. Arms Control and Disarmament Agency  
Bernard O'Keefe, chairman, Executive Committee, EG&G, Inc.

### Executive vice-chairman:

Paul Leventhal, president, Nuclear Control Institute

### Members:

Harold Agnew, former director, Los Alamos National Laboratory  
Yonah Alexander, director, Institute for Studies in International Terrorism, State University of New York  
George Bunn, Stockton Professor of International Law, U.S. Naval War College.  
Donald De Vito, director, New York State Emergency Management Office  
Bernard Feld, professor of physics, Massachusetts Institute of Technology  
David Fischer, former assistant director general for external relations, International Atomic Energy Agency  
Victor Gilinsky, former commissioner, U.S. Nuclear Regulatory Commission  
Reinosuke Hara, executive vice-president, Seiko Instrument and Electronics, Ltd., Japan  
Enrico Jacchia, former director of EURATOM Safeguards, European Economic Community  
Harald Müller, executive director, New Approaches to Non-Proliferation: A European Approach, Centre for European Policy Studies, Brussels; Research Fellow, Peace Research Institute, Frankfurt  
Yuval Ne'eman, director, Sackler Institute, Tel Aviv University, Israel; former Israeli minister of science and technology  
Jerrod Post, M.D., director, Behavioral Sciences, Defense Systems, Inc.  
John Redick, program officer, W. Alton Jones Foundation  
Mohamed Shaker, deputy permanent representative of Egypt to the United Nations; president, 1985 Review Conference of the Nuclear Non-Proliferation Treaty  
Claire Sterling, journalist  
Shuzaburo Takeda, professor of engineering, Tokai University, Japan  
Kenneth Taylor, vice-president, government affairs, Nabisco Brands, Inc.; former Canadian ambassador to Iran  
Theodore Taylor, former deputy director (scientific), U.S. Defense Atomic Support Agency  
Inga Thorsson, former Swedish undersecretary of state for disarmament; president, 1975 Review Conference of the Nuclear Non-Proliferation Treaty  
Stansfield Turner, former director of the Central Intelligence Agency  
Merrill Walters, director, Nuclear Planning Group, NATO, Brussels  
Mason Willrich, senior vice-president, Pacific Gas & Electric Company  
Bertram Wolfe, vice-president and general manager, Nuclear Fuel and Special Projects Division, General Electric Company

## Task force recommendations

### Short-term recommendations

#### *Protecting nuclear weapons*

Nuclear-weapons states should determine whether their weapons are sufficiently protected to deter or repel terrorists.

All tactical nuclear weapons should be fitted with the most advanced self-protecting systems.

The U.S. Nuclear Emergency Search Team should be upgraded.

#### *Protecting nuclear materials*

Civil nuclear materials worldwide in forms suitable for use in weapons should be given protection equivalent to government protection of weapons.

The cost of protecting weapon-usable forms of nuclear

materials should be factored into private decisions to produce and use them.

In the meantime, reexamination of civil applications of plutonium can be conducted on economic grounds.

Conversion of reactors from weapons-grade uranium fuels to lower-enriched uranium not usable in weapons should be considered at this time.

To the extent that civil materials suitable for weapons are used, extraordinary precautions should be taken to protect them from terrorists.

#### *Protecting nuclear facilities*

Denial of access to nuclear facilities should be the basic consideration in protecting against sabotage.

Thorough vigilance against the insider threat is needed.

Guard forces should be thoroughly trained and authorized to use deadly force.

The basis used for designing physical protection of nuclear plants should be reviewed to insure that it accurately reflects the current threat.

Power reactors should be protected against vehicular threats.

Research reactors should have adequate security provisions against terrorists.

Reactor safety designs should be reexamined to protect against an accident caused by terrorists.

IAEA physical-protection guidelines should be reviewed and updated.

Protection standards should be spelled out unambiguously.

#### *Intelligence programs*

National authorities should task their intelligence agencies to apply sufficient resources to the threat of nuclear terrorism.

Concerted efforts to promote cooperation among national intelligence services, including those of the United States and the Soviet Union, should be pursued as part of the effort to counter the nuclear terrorist threat.

National intelligence agencies should look for early indicators of nuclear terrorism.

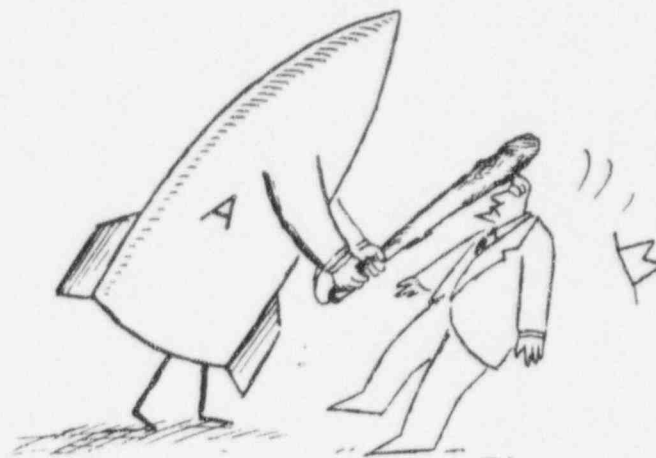
National intelligence agencies should develop behavioral and political profiles of potential nuclear terrorists.

National intelligence agencies should prepare plans on how and when to inform local officials of a credible nuclear threat.

National centers for analyzing intelligence on terrorism should be established and should give high priority to the nuclear threat.

#### *Civil liberties concerns*

*Physical protection and intelligence activities directed at preventing nuclear terrorism always should be exercised with the greatest vigor necessary under the particular circumstances, with full regard to the individual rights of citizens and employees.*



Paul Valery, West Germany

Screening of job applicants and surveillance of employees at nuclear facilities should be conducted in ways to insure that employment is not denied for activities that represent the exercise of basic rights to free speech and association rather than pose a security threat.

Because of the potential danger of emotionally unstable employees and of the insider threat in nuclear plants, employees or job applicants who are to have unrestricted access to vital areas of a plant should be subject to psychological screening and to a check for a national criminal history, including a check of fingerprint records. Any criminal record found, however, should be available to the subject for review, correction, or appeal before any adverse action is taken.

Plant security personnel should be authorized to use deadly force, but the conditions under which the use of deadly force is appropriate and legal should be clearly spelled out in regulations, taking into consideration the laws and customs of particular countries.

In the event of an imminent threat or calamity, national security interests will prevail over individual rights. However, wide-ranging searches for nuclear devices or materials, and detention of suspects or witnesses in connection with a nuclear terrorist incident, should be undertaken with maximum restraint.

#### *Controlling nuclear transfers*

No significant nuclear transfers should be made to a nation that is located in a zone of war or that supports or sponsors international terrorism. Such a policy, if adopted by all nuclear suppliers, would help to deter military attacks on nuclear installations and to deny to terrorists a potential source of nuclear-weapon material and know-how.

Export controls and customs police practices should be reexamined to insure they are adequate to meet the threat of nuclear terrorism.

National criminal laws should be amended as necessary to provide for punishment sufficient to work as a true deter-



rent for violations of nuclear export laws and regulations.

There should be prompt and vigorous prosecution of all persons seeking to smuggle weapons-usable nuclear items out of a country.

#### *U.S.-Soviet cooperation*

Efforts should be made to promote U.S.-Soviet cooperation on intelligence-sharing and on responses to threats or acts of nuclear terrorism. Consideration should be given as to whether joint action against a nuclear terrorist threat might or might not include the use of force by the superpowers.

The proposal by Senators Sam Nunn and John Warner for establishment of U.S.-U.S.S.R. Nuclear Risk Reduction Centers, whose assignments would include principal responsibility for coordinating superpower responses to nuclear terrorist threats, is a major step in the right direction for pursuing these options and should be negotiated promptly.

#### *Arms control initiatives*

The United States and the Soviet Union should pursue current efforts to negotiate deep cuts in their strategic arsenals with a view toward lessening the threat from nuclear weapons by reducing the risk of early use, improving strategic stability, and maintaining credible nuclear deterrence.

Ongoing efforts to reduce the size of nuclear arsenals should include the smaller battlefield weapons that are most susceptible to attack or theft by terrorists.

Additional nuclear-weapon-free zones, which would reduce potential access to nuclear weapons, should be negotiated where it proves consistent with the security interests of the nations concerned.

In meeting obligations under existing treaties, all nations should examine the antiterrorist benefit which would accrue from a strictly verifiable comprehensive test ban.

#### *Convention on Physical Protection of Nuclear Materials*

The Task Force recommends that the Convention on the Physical Protection of Nuclear Materials, which has not come into force for lack of accessions, should be ratified promptly. It is particularly important to secure ratification by the 11 members of the European Economic Community, which would provide more than the needed number of accessions.

At the same time, urgent steps should be taken bilaterally and through the International Atomic Energy Agency to establish more stringent minimum requirements for protection of weapon-usable nuclear materials while in domestic use, storage, or transport worldwide.

#### *Role of emergency-management programs*

Emergency management organizations at the regional and local level should be provided the fiscal and human resources needed to cope effectively with a threat or act of nuclear terrorism.

In particular, there should be consideration of what arrangements can be made in advance of a nuclear terrorism crisis to ensure the sharing of information by national intelligence agencies on a timely basis with selected regional and local officials during such a crisis—information needed for decision making on evacuation and other protective measures.

The issuance of security clearances to emergency management officials is an essential first step.

#### *Role of the media*

Because of the possibility of widespread panic, injury, and death resulting from a credible threat by nuclear terrorists, government officials and media representatives should cooperate in planning how to provide timely and accurate information in such a contingency.

To the extent possible, joint guidelines should be developed in anticipation of a crisis by the responsible national government agencies with regard to how and when information will be disseminated during a crisis. The key consideration should be at what point in a crisis, if the threat proves real, there still would be time to order an evacuation in a manner that minimizes injury and death and promotes public order. Leading media representatives and state and local officials should be invited to participate in preparation of the guidelines.

### Long-term recommendations

#### *International measures*

All states should embark on outlawing acts of nuclear terrorism by signing and ratifying the Convention on the Physical Protection of Nuclear Materials.

International agreements in the wake of the Chernobyl accident should include measures to deal with the terrorist threat.

The U.N. Security Council should approve a resolution on nuclear terrorism.

An agreement specifying additional acts of nuclear terrorism is needed.

#### *Emerging nuclear technologies*

Emerging technologies capable of simplifying the production of weapon-usable forms of nuclear material should be followed as a possible route for acquisition of such materials by terrorists.

Advanced enrichment and production technologies should be developed with restraint and used only if required to meet national energy needs.

Efforts to develop forms of nuclear fuel less subject to proliferation should be further encouraged in the interest of lessening the dangers of nuclear terrorism. In particular, the development of fuels containing thorium in more proliferation- and terrorist-resistant fuel cycles should be considered. □

CERTIFICATE OF SERVICE - Docket No.(s) 50-160-REN

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'95 SEP -5 A11:18

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