



## INTERNATIONAL ATOMIC ENERGY AGENCY

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*IAEA experts will be available for phone interviews October 31 – November 2, 2001. To schedule an interview, please contact Nils Hoffman at 703-820-2244, [nils@hoffmanpr.com](mailto:nils@hoffmanpr.com)*

### **Calculating the New Global Nuclear Terrorism Threat**

The head of the International Atomic Energy Agency (IAEA) says that the ruthlessness of the September 11 attacks has alerted the world to the potential of nuclear terrorism – making it “far more likely” that terrorists could target nuclear facilities, nuclear material and radioactive sources worldwide.

Experts from around the world are meeting at the IAEA on October 29 to November 2 at an international symposium on nuclear safeguards, verification, and security. A special session on November 2 focuses on the issue of combating nuclear terrorism.

“The willingness of terrorists to sacrifice their lives to achieve their evil aims creates a new dimension in the fight against terrorism,” says Mohamed ElBaradei, IAEA Director General, whose Agency sets world standards for nuclear safety and security. “We are not just dealing with the possibility of governments diverting nuclear materials into clandestine weapons programs. Now we have been alerted to the potential of terrorists targeting nuclear facilities or using radioactive sources to incite panic, contaminate property, and even cause injury or death among civilian populations.”

“An unconventional threat requires an unconventional response, and the whole world needs to join together and take responsibility for the security of nuclear material,” says Mr. ElBaradei. “Because radiation knows no frontiers, States need to recognise that safety and security of nuclear material is a legitimate concern of all States. Countries must demonstrate, not only to their own populations, but to their neighbours and the world that strong security systems are in

place. The willingness of terrorists to commit suicide to achieve their evil aims makes the nuclear terrorism threat far more likely than it was before September 11.”

The IAEA, the UN nuclear watchdog agency based in Vienna, helps countries around the world to prevent, intercept and respond to terrorist acts and other nuclear safety and security incidents. It has the only international response system in place that would be in a position to immediately react to assist countries in case of a radiological emergency caused by a nuclear terrorist attack.

Although terrorists have never used a nuclear weapon, reports that some terrorists groups, particularly al-Qaeda, have attempted to acquire nuclear material is a cause of great concern.

According to the IAEA, since 1993, there have been 175 cases of trafficking in nuclear material and 201 cases of trafficking in other radioactive sources (medical, industrial). However, only 18 of these cases have actually involved small amounts of highly enriched uranium or plutonium, the material needed to produce a nuclear bomb. IAEA experts judge the quantities involved to be insufficient to construct a nuclear explosive device. “However, any such materials in illicit commerce and conceivably accessible to terrorist groups is deeply troubling,” says Mr. ElBaradei.

There has been a six-fold increase in nuclear material in peaceful programmes worldwide since 1970. According to IAEA figures, there are: 438 nuclear power reactors; 651 research reactors (of these 284 are in operation) and 250 fuel cycle plants around the world, which including uranium mills and plants that convert, enrich store and reprocess nuclear material. Additionally, tens of thousands of radiation sources are used in medicine, industry, agriculture and research.

While the level of security at nuclear facilities is generally considered to be very high, security of medical and industrial radiation sources is disturbingly weak in some countries. “The controls on nuclear material and radioactive sources are uneven,” says Mr. ElBaradei, “Security is as good as its weakest link and loose nuclear material in any country is a potential threat to the entire world.”

### **The Risks Involved:**

IAEA experts have evaluated the risks for nuclear terrorism in these three categories:

**Nuclear facilities:** IAEA experts believe the primary risks associated with nuclear facilities would involve the theft or diversion of nuclear material from the facility, or a physical attack or act of sabotage designed to cause an uncontrolled release of radioactivity to the surrounding environment.

From its inception, the nuclear industry has been keenly aware of the dangers of nuclear material falling into terrorists hands. At all levels – operator, State and international – there is a complex infrastructure at work to ensure nuclear material is accounted for; safeguarded from diversion; and protected from theft and sabotage.

Billions of dollars per year are already being spent to protect and defend nuclear facilities. Indeed, no other industry in the world has such a sophisticated level of security. Nuclear facilities are protected by well-trained security forces and are extremely robust, designed to withstand, for example, earthquakes, tornado-force winds and accidental crashes of small aircraft, although it is not automatic that any attack would result in a release of radioactivity, they are however industrial facilities and as such are not hardened to withstand acts of war.

The extent of damage that could be caused by the intentional crash of a large, fully fuelled jetliner into a nuclear reactor containment or other nuclear facilities is still a matter for analysis. Nuclear facility designs vary from country to country, so studies will have to take specific plant designs into account. “After September 11, we realized that nuclear facilities — like dams, refineries, chemical production facilities or skyscrapers — have their vulnerabilities,” Mr. ElBaradei says. “There is no sanctuary anymore, no safety zone.”

Countries around the world with nuclear facilities have heightened security since the September 11 attacks, and are conducting urgent analyses of their safety and security systems. The IAEA plans to strengthen and tailor its existing safety and security services to address the terrorism threat, by assisting countries in upgrading the security and safety of their nuclear facilities.

**Nuclear Material:** According to IAEA experts, terrorists obtaining nuclear weapons would be the most devastating scenario. “While we cannot exclude the possibility that terrorists could get hold of some nuclear material,” says Mr. ElBaradei, “it is highly unlikely they could use it to manufacture and successfully detonate a nuclear bomb. Still, no scenario is impossible.”

Beyond the difficulty for terrorists to obtain weapon usable material – scientists estimate that 25 kg of highly enriched uranium and 8 kg of plutonium would be needed make a bomb – actually producing a nuclear weapon is far from a trivial exercise. Scientific expertise and access to sophisticated equipment would be required. However, when the Cold War ended, thousands of highly knowledgeable scientists and engineers previously involved in the Soviet Union’s weapons programme were laid off or found their incomes drastically reduced. Another legacy of the Cold War are the disturbing reports, albeit unsubstantiated, of missing nuclear weapons.

Nuclear material has traditionally been subjected to extensive national protection measures. To prevent theft of nuclear material, nuclear facilities employ a range of protection measures, including site security forces, site access control, employee screening and co-ordination with local and national security authorities. In some States, national security forces provide back-up to facility security. The IAEA offers countries around the world assessments and advice on physical security. It also maintains a database on incidents of trafficking in nuclear material, although the IAEA considers the information States provide on incidents and on follow-up to be inadequate.

In non-nuclear weapon States, the IAEA carries out international safeguards to verify that nuclear material has not been diverted to non-peaceful uses. These safeguards, the verification tool entrusted to the IAEA in the 1970 Treaty on the Non-Proliferation of Nuclear Weapons (NPT), also play an important role in reducing the risk that terrorists could acquire nuclear material without detection. But when the NPT was drafted, nuclear terrorism was not perceived as a significant threat.

However, safeguards require that a state account for all its nuclear material and serve as a “burglar alarm” against a terrorist. A well-designed system will also help to pinpoint the origin of missing material, identify individuals who had access to it, and facilitate recovery of the material.

The nuclear weapon programmes in the five Nuclear Weapons States – China, France, the Russian Federation, the United Kingdom and the United States, as well any that may exist in India, Pakistan and Israel, the three non-NPT countries known to have nuclear programmes – are not under the purview of IAEA safeguards. “Although I understand there is a high level of security for nuclear weapons,” says Mr. ElBaradei, “I hope that all of these countries are urgently reviewing the safety and security of their nuclear weapons.”

“There have been two nuclear shocks to the world already – the Chernobyl accident and the IAEA’s discovery of Iraq’s clandestine nuclear weapons programme,” say Mr. ElBaradei. “It will be vital we do all in our power to prevent a third.”

The IAEA plans to significantly expand its advisory services and help States upgrade protection of their nuclear materials.

***Radioactive Sources:*** IAEA experts are concerned that terrorists could develop a crude radiological dispersal device using radioactive sources commonly used in every day life. The number of radioactive sources around the world is vast: those used in radiotherapy alone are in the order of ten thousand. Many more are used in industry; for example, to check for welding errors or cracks in buildings, pipelines and structures. They are also used for the preservation of food. There is a large number of unwanted radioactive sources, many of them abandoned, others being simply “orphaned” of any regulatory control.

Such a weapon, sometimes referred to as a “dirty bomb”, could be made by shrouding conventional explosives around a source containing radioactive material, although handling the nuclear material could well be deadly.

“Security of radioactive materials has traditionally been relatively light,” says Abel Gonzalez, the IAEA’s Director of Radiation and Waste Safety. “There are few security precautions on radiotherapy equipment and a large source could be removed quite easily, especially if those involved have no regard for their own health. Moreover, in many countries, the regulatory oversight of radiation sources is weak. As a result, an undetermined number of radioactive sources have become orphaned of regulatory control and their location is unknown.”

“Certainly, the effects of a dirty bomb would not be devastating in terms of human life,” says Mr. Gonzalez. “But contamination in even small quantities could have major psychological and economic effects.”

The accidental contamination of Goiânia, a major city in Brazil, with a medical radiation source exemplifies the potential for a terrorist group to wreak havoc on an urban centre. In September 1987, scrap scavengers broke into an abandoned radiological clinic and stole a highly radioactive caesium 137 source and moved it to a junkyard for sale as scrap. Workers broke open the encasement and cut up the 20-gram capsule of caesium 137 in to pieces. The valuable-looking

scrap was then distributed to friends and family of workers around the city. Fourteen people were overexposed, and 249 contaminated. Four subsequently died. More than 110,000 people had to be continuously monitored. To decontaminate the area, 125,000 drums and 1470 boxes were filled with contaminated clothing, furniture, dirt and other materials; 85 houses had to be destroyed.

“We are dealing with a totally new equation since September 11,” Mr. Gonzalez said. “These terrorists demonstrated before our eyes their willingness to give up their lives. The deadliness of handling intensely radioactive material can no longer be seen as an effective deterrent.”

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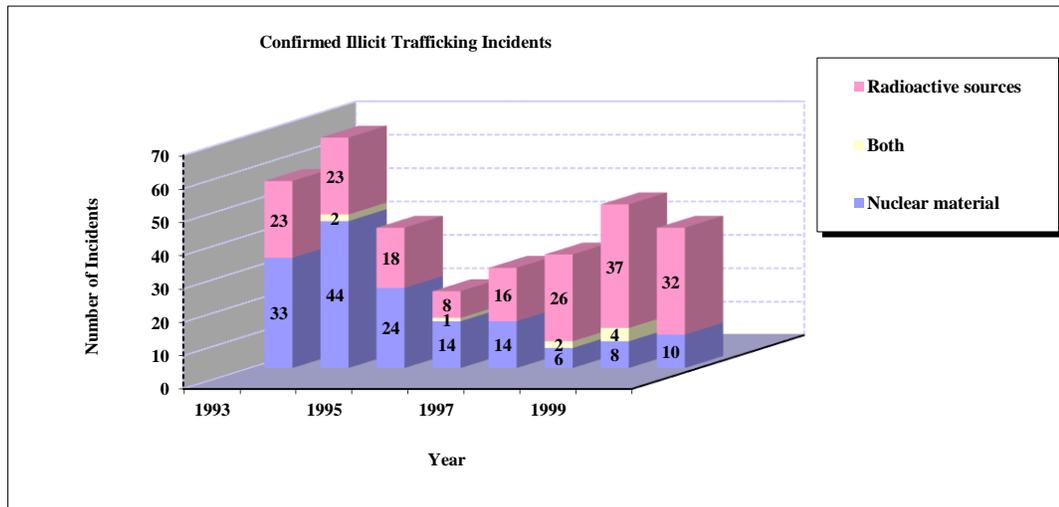
The IAEA is proposing a number of new initiatives, including strengthening border monitoring, helping States search for and dispose of orphan sources and strengthening the capabilities of the IAEA Emergency Response Centre to react to radiological emergencies following a terrorist attack.

“September 11 presented us with a clear and present danger and a global threat that requires global action,” says Mohamed ElBaradei. “Many of our programs go to the heart of combating nuclear terrorism, but we now have to actively reinforce safeguards, expand our systems for combating smuggling in nuclear material and upgrade our safety and security services.”

“At a minimum,” Mr. ElBaradei says, “national assessments of security infrastructure for all types of nuclear and radioactive material should be required. Countries will have something to gain from allowing international assessments to demonstrate to the world that they are keeping their nuclear material secure.”

In the short term, the IAEA estimates that at least \$30-\$50 million annually will be needed to strengthen and expand its programs to meet this terrorist threat.

*The International Atomic Energy Agency (IAEA), based in Vienna, has 132 Member States. It has 2200 employees and an annual budget of about \$330 Million. The IAEA, a UN agency, serves as the world's intergovernmental forum for scientific and technical co-operation in peaceful uses of nuclear energy. It is also the international inspectorate for the application of nuclear verification measures to ensure that nuclear programmes are peaceful.*



IAEA VERIFICATION ACTIVITIES IN 2000	
Inspections performed	2 467
Person-days of inspection	10 264
Seals applied to nuclear material or safeguards equipment, detached and subsequently verified (including seals applied jointly with EURATOM)	25 484
Optical surveillance films reviewed	873
Video tapes reviewed	5 226
Nuclear material samples analysed	626
Nuclear material analytical results reported	1 401
Environmental samples analysed	246
<b>Nuclear material under safeguards (tonnes)</b>	
Plutonium contained in irradiated fuel	642.8
Separated plutonium outside reactor core	72.2
Recycled plutonium in fuel elements in reactor cores	10.7
High enriched uranium	21.8
Low enriched uranium	48 974
Source material	91 677