
Nuclear Security and Preventing Nuclear Terrorism: North America and the EU

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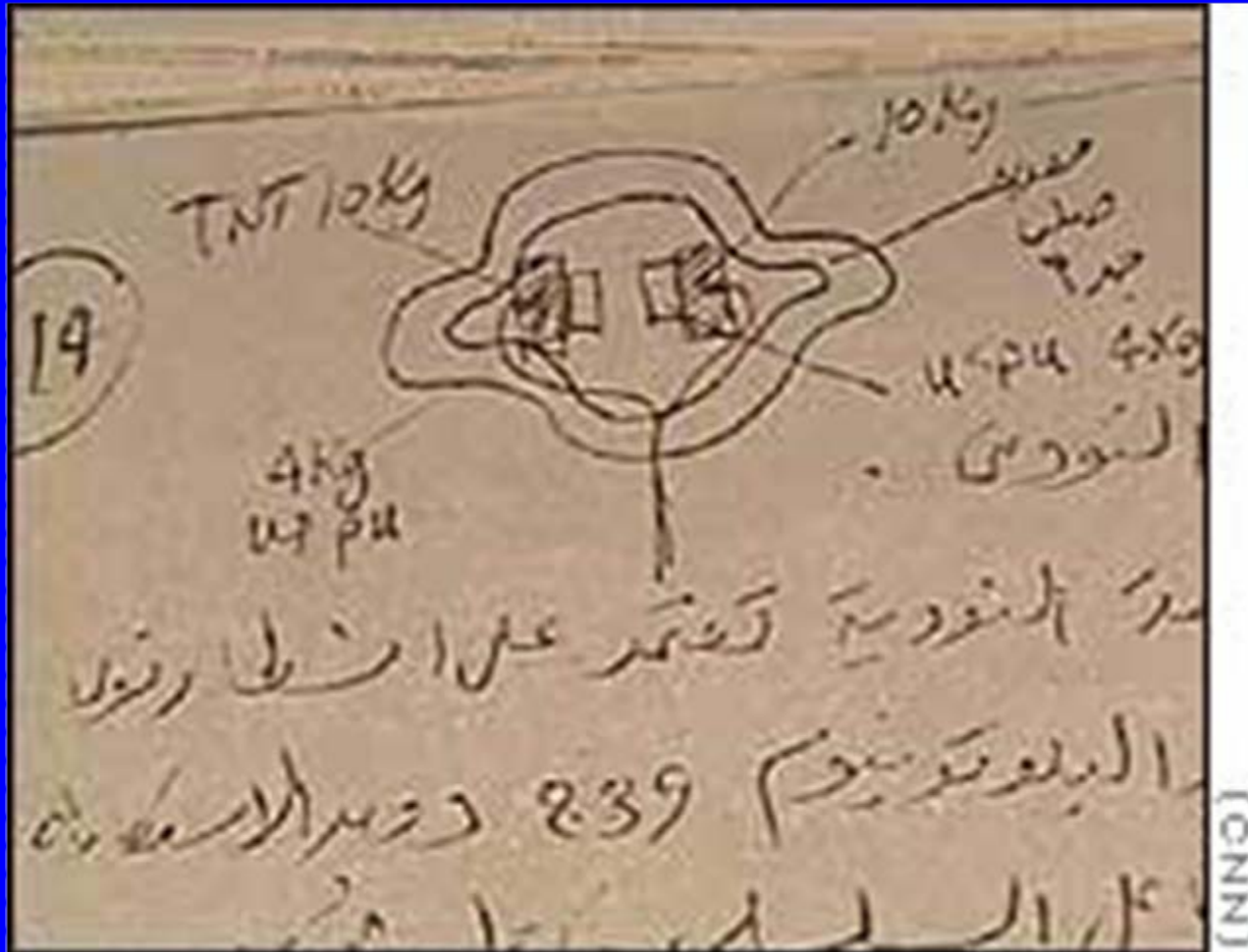
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Project on Managing the Atom

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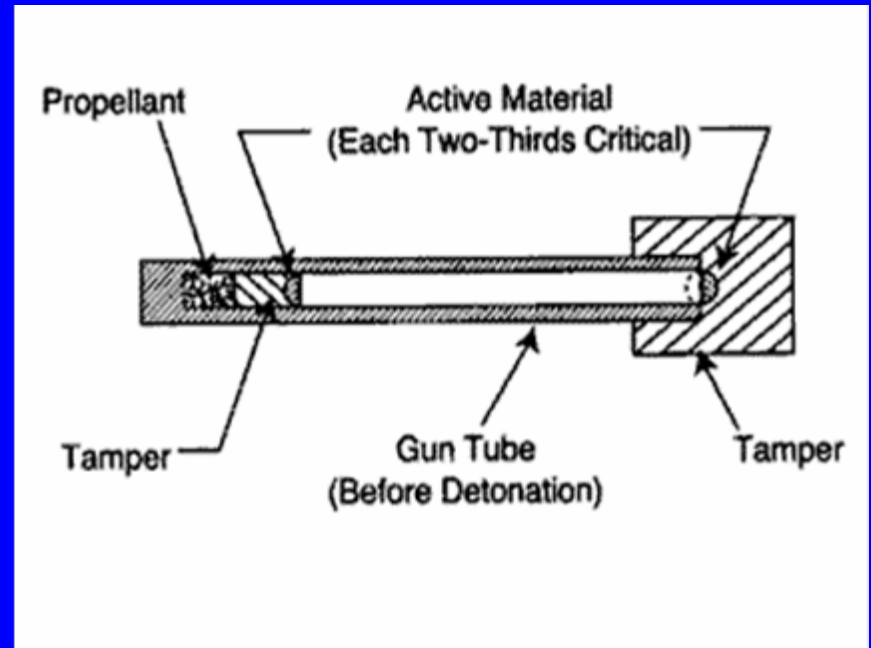
Terrorists are seeking nuclear weapons...



Source: CNN

With nuclear material, terrorists may be able to make crude nuclear bombs

- With HEU, gun-type bomb – as obliterated Hiroshima – very plausibly within capabilities of sophisticated terrorist group
- Implosion bomb (required for Pu) more difficult, still conceivable (especially if they got help)



Source: NATO

Nuclear terrorism anywhere would be a global catastrophe

- Not just a risk to the United States
- Economic, political, military consequences would reverberate worldwide

“Were such an attack to occur, it would not only cause widespread death and destruction, but would stagger the world economy and thrust tens of millions of people into dire poverty.... [A]ny nuclear terrorist attack would have a second death toll throughout the developing world.”
– *Kofi Annan, “A Global Strategy for Fighting Terrorism,” March 10, 2005*

- Political consequences would doom prospects for large-scale nuclear growth, putting nuclear industry at risk

Insecure nuclear material anywhere is a threat to everyone, everywhere

Terrorists have global reach

- Attacks from:
 - New York to Moscow
 - London to Bali
 - Madrid to Morocco
- Before al Qaeda, Aum Shinrikyo sought nuclear and biological weapons, launched nerve gas attacks
 - Homegrown Japanese cult – could happen anywhere
 - No intelligence agencies were aware of them
- Embassies in Kenya and Tanzania attacked only because they were vulnerable American targets

Similarly, terrorists will get plutonium or HEU wherever the combination of their strength and the security system's weakness makes it easiest to steal

Steps to secure all nuclear stockpiles worldwide in four years

- Overcome complacency
 - Policymakers will only take action if they come to believe nuclear theft and terrorism are urgent threats to *their* countries' interests
 - Detailed joint threat briefings at meads of leaders, ministers
 - Discussions between intelligence agencies
 - Realistic “red team” tests of nuclear security systems
- Upgrades to higher standards in more countries
 - All countries with HEU or plutonium have more to do to ensure stocks are effectively protected against sophisticated outsider and insider capabilities terrorists and thieves have demonstrated
 - Combination of donor-funded upgrades and steps countries take themselves – only way to get the job done in four years
 - Regulation, sustainability, security culture all key
 - All states, operators, should participate in exchanges of “best practices”

Steps to secure all nuclear stockpiles worldwide in four years (II)

- Broader approach to consolidation
 - Reduce number of sites with nuclear weapons, HEU, or plutonium as much as possible – achieve higher security at lower cost
 - Consolidation efforts targeted on plutonium and weapons as well as HEU-fueled research reactors
 - Broaden effort to include all HEU, including in wealthy countries
 - Broader range of incentives
 - Broader range of policy tools (e.g., incentives for little-used reactors to shut down – in some cases quicker and cheaper than conversion)
- Effective global standards
 - Nuclear security only as strong as its weakest link
 - All countries with HEU or plutonium must ensure they are at least protected against modest group of well-armed, well-trained outsiders (who can operate as more than one team), well-placed insider, or both together
 - High-threat countries must protect against more potent adversaries

Steps for the United States

- Lead fast-paced global nuclear security effort
 - Seek to use momentum from nuclear security summit to achieve major on-the-ground improvements around the world
 - Ratify physical protection convention amendment
 - Host international nuclear security peer reviews
- Secure U.S. HEU-fueled research reactors
 - Phase out research-reactor exemption from security rules – DOE should pay resulting security costs
 - Convert remaining HEU-fueled reactors to LEU as soon as possible
- Eliminate gap between DOE and NRC security rules
 - NRC-regulated facilities currently do not have to protect HEU against threats as substantial as DOE facilities do
- Launch targeted programs to strengthen security culture
 - Many recent incidents demonstrate continued weaknesses

Steps for Canada and Mexico

▫ Canada:

- Permanently end HEU-based medical isotope production
- Convert remaining HEU-fueled research reactors
- Eliminate HEU stocks wherever possible (blend down HEU left over from isotope production)
- Ensure remaining stocks protected against broad range of threats
- Contribute to global effort – donor state, source of best practices
- Ratify physical protection convention amendment
- Host international peer review missions

▫ Mexico

- Finish conversion of research reactor, eliminate HEU

Steps for the European Union

- u Convert research reactors/minimize HEU
 - Permanently end HEU-based medical isotope production
 - Convert remaining HEU-fueled research reactors
 - » German FRM-II poses a special challenge – high-density HEU fuel
 - Eliminate HEU stocks wherever possible
- u Consolidate plutonium, limit accumulation of stocks
 - Manage reprocessing, use as fuel to reduce stocks over time
- u Ensure high security standards throughout Europe
 - All states must protect at least against common baseline set of threats
 - Coordinate security baseline, peer reviews, through EURATOM?
 - Provide armed protection while addressing cultural barriers
- u Help lead fast-paced global campaign
 - Donor states, sources of best practices, expertise

If nuclear security isn't getting better, it's getting worse

For further information...

- Website of the Managing the Atom project:
 - <http://www.managingtheatom.org>
- A major web section we maintain for the Nuclear Threat Initiative, *Controlling Nuclear Warheads and Materials*
 - <http://www.nti.org/securingthebomb>
- Includes our just-released report:
 - *Securing the Bomb 2010: Securing All Nuclear Stockpiles in Four Years* (April 2010)
- For regular e-mail updates from Managing the Atom, or to explore volunteer internships, write to atom@harvard.edu

Backup slides of needed

Nuclear security is the foundation for the three pillars of the NPT

- Nuclear security essential for disarmament, nonproliferation, peaceful use
- Poor nuclear security, making available weapons-usable nuclear material, could lead to virtually any state – or even some sophisticated terrorist groups – being able to make a crude nuclear bomb, fatally undermining nonproliferation
- No one will disarm if poor nuclear security means terrorists or other states might get nuclear weapons without warning at any moment
- A terrorist nuclear bomb or major sabotage – a “security Chernobyl” – would doom prospects for nuclear power growing enough to be a major part of the response to climate change

What's required?

- Sustained White House leadership to overcome obstacles
 - Complacency – many policymakers, nuclear managers do not believe nuclear terrorism is a realistic threat
 - Secrecy and sovereignty
 - Political disputes
 - Bureaucratic obstacles
- Comprehensive plan
 - Assign responsibilities
 - Match resources to objectives
 - Indicators to assess progress
 - Flexibility to close gaps, seize opportunities
- Adequate resources
 - Both money and people

Leadership is more important than money – but more money will be needed if obstacles can be overcome

What is the problem to be solved?

- Terrorists cannot make a nuclear bomb without nuclear material, the most likely way they could get nuclear material is for it to be stolen from an insecure stockpile
- Security for nuclear materials in many countries leaves too great a risk that terrorists and thieves could overcome it
- Pakistan
 - Small, heavily guarded stockpile
 - Immense insider and outsider threats
 - Risk reduction must include both strengthening nuclear security and reducing adversaries' capabilities
- Russia
 - World's largest stockpiles, in largest number of locations
 - Dramatically improved security and accounting
 - Important weaknesses remain – insider threats and corruption, sustainability, regulation, guard forces...

What is the problem to be solved?

(II)

- HEU-fueled research reactors
 - Most have modest stocks (though some have large, high-quality stocks)
 - Most have very modest security measures in place
 - Particular issues in developing or transition countries with substantial HEU stocks (Ukraine, Belarus, South Africa, Kazakhstan)
- Other areas also pose risks
 - Transports – frequent, more difficult to secure against attack
 - Plutonium separation – creates unneeded risks
- Rich countries also pose risks
 - Some have large stocks of HEU or plutonium, no on-site armed guards, or protection against only very modest threats
 - NRC-regulated HEU-fueled research reactors in the United States a prime example

Broad range of demonstrated adversary capabilities and tactics: insider threats

- Multiple insiders working together
 - Many cases of theft from guarded facilities worldwide
- Often including guards
 - Most documented thefts of valuable items from guarded facilities involve insiders – guards among the most common insiders
 - Goloskokov: guards “the most dangerous internal adversaries”
- Motivations:
 - Desperation
 - Greed/bribery/corruption
 - Ideological persuasion
 - Blackmail

A trustworthy employee may not be trustworthy anymore if his family's lives are at risk

For discussion: Adversary capabilities all HEU and Pu should be protected against

- Modest team of well-armed, well-trained outsiders
 - Capable of operating as more than one team
 - Automatic weapons and explosives
 - RPGs (available to terrorists in bazaars worldwide)
 - Help from an insider
- A well-placed insider
 - Knowledge of the security system
- Deception attacks
- Bombs that could be carried on a person, or in a car or van
- Unusual vehicles or routes

Protecting against at least this set of threats is a “best practice in implementing DBT methodology – high-threat countries must protect against more

Implementing the DBT

- National DBTs should be developed by groups with access to all relevant threat information – independent of operators
 - DBT must be *spectrum* of possibilities, not a single point estimate
- Operators must develop and implement security plans that provide effective protection against all elements of the DBT
- Regulators must review plans, inspect implementation to confirm that operators can protect against the DBT
- Assessment should include realistic full-system testing, designed to assess response to intelligent adversaries probing for the weak points
 - Can outsiders break in and steal material?
 - Can an insider steal material and smuggle it out?

Requirements of UNSCR 1540

- Arguably, states are already legally required to protect HEU and plutonium against plausible insider and outsider threats
- UNSC 1540 legally requires all states to put in place “appropriate effective” nuclear security and accounting
 - No definition of essential elements of “appropriate effective” systems
 - Plain English: must provide effective protection against demonstrated adversary threats
 - Leading nuclear states should seek common understanding of what must be in place for security systems to be “effective” as required
 - Then seek to help (and pressure) states to put those essential elements of effective systems in place

Ultimately, effective nuclear security should be part of “price of admission” for doing business in the international nuclear market

International cooperation to implement effective nuclear security

- UNSC 1887 calls for securing all nuclear material within four years
 - Goal should be to ensure that all HEU and Pu worldwide is effectively protected against the full spectrum of plausible adversary threats in the country where it exists
 - In safest countries, against the threats terrorists with global reach could pose
- Countries should cooperate to achieve this goal
 - States which need help must take responsibility for asking for it
 - States able to help must take responsibility for providing it
 - U.S.-Russian cooperation shows what can be accomplished
- International recommendations and agreements should be modified to call for states to implement such effective nuclear security measures (e.g., revision of INFCIRC/225)