
Next steps to strengthen nuclear security and prevent nuclear terrorism

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“Next Generation Nuclear Security: Measuring Progress and Charting the Way Forward”

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<http://www.managingtheatom.org>

Nuclear terrorism remains a real danger

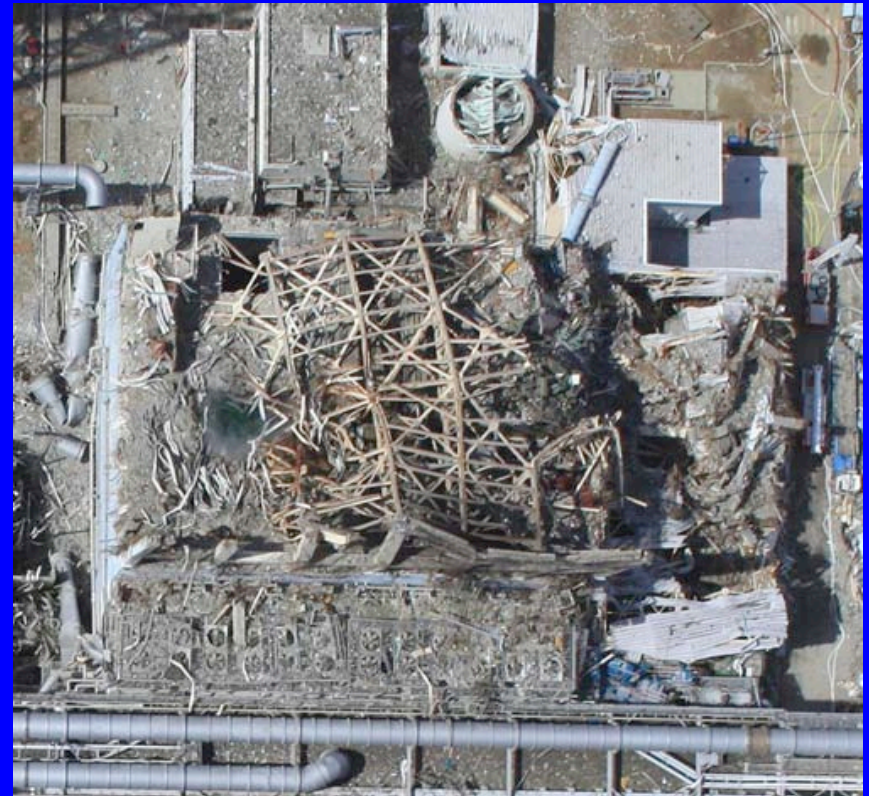
- ◆ Some terrorists are seeking nuclear weapons and materials
- ◆ Some terrorists could plausibly make a crude nuclear bomb if they got needed nuclear material
- ◆ ~ 20 real cases of theft or smuggling of HEU or plutonium (most recent March 2010)
 - Inadequate security measures to defeat demonstrated threats in many countries
- ◆ Devastating consequences – would reverberate worldwide
 - Even small probability is enough to motivate action



Source: Block/AP

Nuclear safety and security: Strengthening the regime after Fukushima

- ◆ Fukushima tragedy offers lessons for both safety and security
 - Took extraordinary natural disaster to take out both normal and emergency cooling
 - For terrorists, this may be part of the plan – changes probabilities
 - Odds of next major radioactive disaster coming purely by accident may be lower than odds of it happening from hostile action
 - All nations should request independent, international review of both safety and security

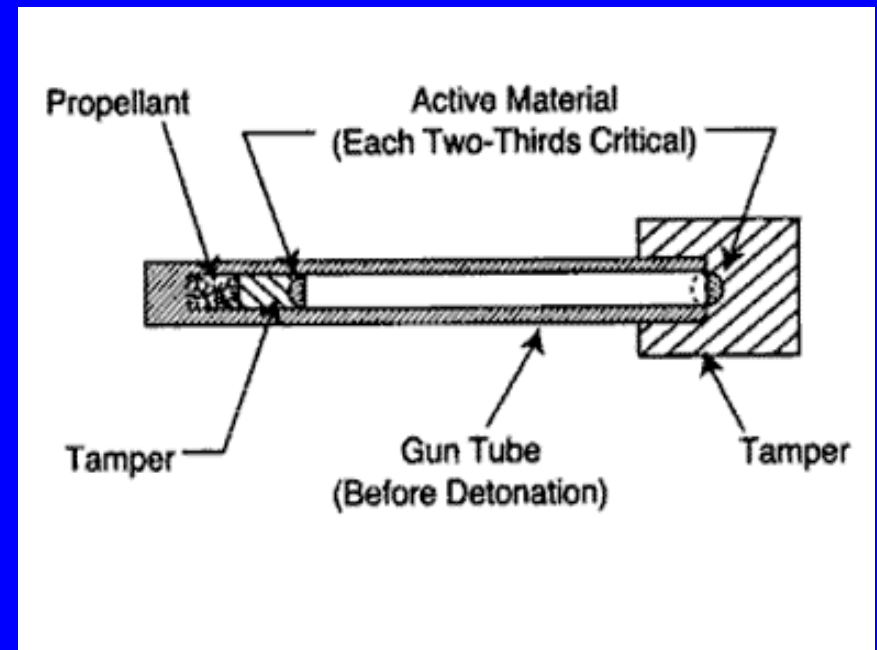


Source: Air Photo Service, Japan

You can't be safe without being secure – and you can't be secure without being safe.

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)
 - Doesn't need to be as complex as Nagasaki bomb

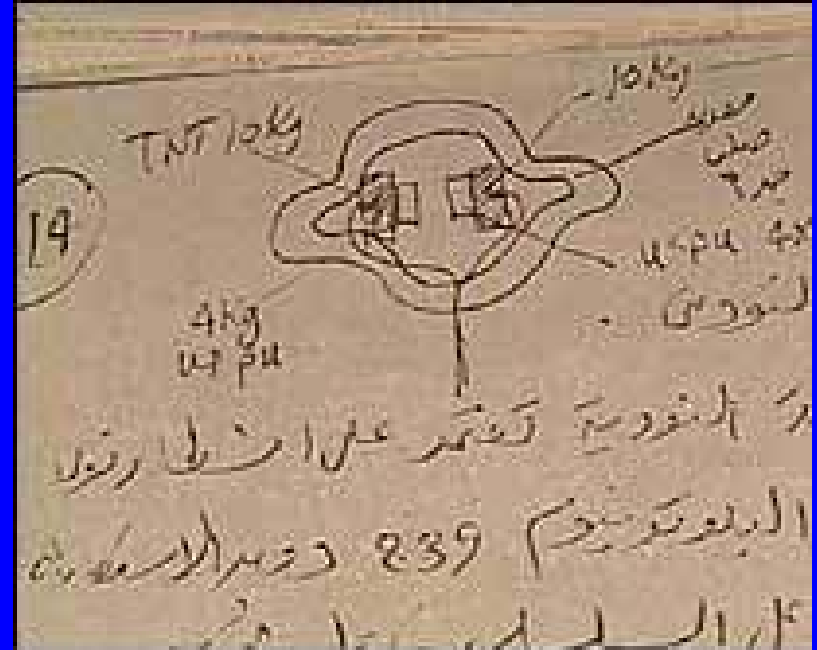


Source: NATO

Immense difference between difficulty of making safe, reliable weapons for use in a missile or combat aircraft and making crude, unsafe, unreliable weapons for delivery by truck

Terrorists are seeking nuclear weapons

- ◆ al Qaeda has repeatedly sought to get nuclear bomb materials, recruit nuclear expertise
- ◆ Focused nuclear program reported directly to Zawahiri
 - Carried out crude explosive tests in the Afghan desert – implosion-related
 - Got *fatwa* authorizing use of nuclear weapons in 2003 – Zawahiri elaborated on argument in 2008
- ◆ Chechen teams scouted Russian nuclear weapon sites in 2001
- ◆ Japanese terror cult Aum Shinrikyo sought nuclear weapons in 1990s



Source: CNN

Terrorists have considered nuclear sabotage

- ◆ al Qaeda senior leadership has explored the possibility of sabotaging nuclear facilities
- ◆ Chechen terrorists have threatened and planned attacks on nuclear facilities
- ◆ Terrorists who seized a Moscow theater in 2002 considered seizing a reactor at the Kurchatov Institute instead



Source: Air Photo Service, Japan

Nuclear material is not hard to smuggle – plutonium box for first-ever bomb



Source: Los Alamos

Major nuclear security progress – but more to be done

- ◆ Dozens of sites with dramatically improved security
- ◆ Dozens of sites with all potential nuclear bomb material removed
- ◆ Nearly all planned comprehensive upgrades in Russia and former Soviet Union completed
- ◆ But many weaknesses remain, in many countries
 - Protection against only modest threats
 - Lack of on-site armed guards
 - Limited insider protection



Source: Department of Defense

What is the evidence that current nuclear security is inadequate?

- ◆ Continuing seizures of weapons-usable material
 - ~20 real cases involving HEU or Pu since 1992
 - Most recent case: HEU in Georgia, March 2010
 - But material in recent seizures *could* have been stolen long ago
- ◆ “Red team” tests indicate security systems can be defeated by intelligent adversaries looking for weak points
 - Repeated cases in U.S. tests – though U.S. has more stringent security requirements than virtually any other country
 - Most other countries don’t carry out such tests
- ◆ Successful thefts and attacks at well-secured non-nuclear facilities – demonstrating adversary capabilities
 - Repeated cases of use of insiders, covert outsider attacks, unusual tactics, succeeding in stealing from/attacking heavily guarded sites
 - Existing nuclear security measures in many countries demonstrably insufficient to protect against such adversary capabilities

Seizing the opportunities from the nuclear security summit

- ◆ Summit raised the issue to presidents and prime ministers in an unprecedented way
 - Major contribution to building the sense of urgency and commitment around the world
 - Agreement on securing all vulnerable material within four years
 - Many significant commitments (e.g., Ukraine's commitment to eliminate all HEU by the end of 2012)
 - Agreement to hold another summit in 2012, regular meetings between, helps hold countries' feet to the fire
- ◆ Challenge now is moving from words to deeds
 - Need intensive diplomacy to convince countries to toughen security rules, convert research reactors, eliminate stocks where possible
 - Unfortunate funding constraint: FY2010 < FY2009, FY2011 on continuing resolution
 - Huge obstacles: complacency, sovereignty, secrecy, bureaucracy, politics between states...

Learning from Fukushima

- ◆ Major innovations result from crises
 - Three Mile Island => Institute of Nuclear Power Operations
 - Chernobyl => Nuclear Safety Convention, WANO, OSART...
 - What steps will the world take after Fukushima?
- ◆ Need steps to strengthen barriers against both paths to nuclear disasters:
 - Accidents
 - Terrorism
- ◆ World is much less prepared for security incidents than for safety incidents
 - Many reactors have no armed guards, otherwise weak security
 - Nuclear security regime far weaker than safety regime
- ◆ Need new standards, broader international reviews
 - Restoring public confidence central to future of nuclear energy

What would success look like?

- ◆ Number of sites with nuclear weapons, HEU, or separated plutonium greatly reduced
- ◆ All countries with HEU, Pu, or major nuclear facilities put in place *at least* a “baseline” level of nuclear security
 - Protection against a well-placed insider, a modest group of well-trained and well-armed outsiders (able to operate as more than one team), or both outsiders and an insider together
 - Countries facing higher adversary threats put higher levels of security in place
- ◆ Strong security cultures in place, focused on continual improvement, search for sustainable excellence
- ◆ Measures in place to confirm strong security performance
 - Effective regulation, inspection, enforcement
 - Regular, realistic performance tests – including “red teams”
 - Independent, international review – becoming the norm

Belief in the threat – the key to success

- ◆ Effective and lasting nuclear security worldwide will not be achieved unless key policymakers and nuclear managers around the world come to believe nuclear terrorism is a real threat to *their* countries' security, worthy of investing their time and resources to address it
- ◆ Steps to convince states this is a real and urgent threat:
 - Intelligence-agency discussions – most states rely on their intelligence agencies to assess key security threats
 - Joint threat briefings – by their experts and our experts, together
 - Nuclear terrorism exercises and simulations
 - “Red team” tests of nuclear security effectiveness
 - Fast-paced nuclear security reviews – by teams trusted by the leadership of each country
 - Shared databases of real incidents related to nuclear security, capabilities and tactics thieves and terrorists have used, lessons learned

Security culture matters: Propped-open security door



Source: GAO, Nuclear Nonproliferation: Security of Russia's Nuclear Material Improving, More Enhancements Needed (GAO, 2001)

For further reading...

- ◆ Full text of *Managing the Atom* publications at:
 - <http://www.managingtheatom.org>
- ◆ *Securing the Bomb 2010*:
 - <http://www.nti.org/securingthebomb>
- ◆ For regular e-mail updates from *Managing the Atom*, write to atom@harvard.edu