Designing a Multi-Layered Defense Against Nuclear Terror

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Blocking the Terrorist Pathway to the Bomb

**TERRORIST PATHWAY TO THE BOMB**

- Form a Highly Capable Group with Extreme Objectives
- Decide to Escalate to Nuclear Violence
- Steal Nuclear Weapon or Weapons Material
- Acquire Stolen Weapon/Material to Safe Haven
- Smuggle Weapon/Material to Safe Haven
- Construct Weapon (Or Sidestep Weapon’s Safeguards)
- Smuggle Weapon to Target Country
- Transport Weapon to Target Location
- Detonate Weapon

**COOPERATIVE THREAT REDUCTION EFFORTS**

- Secure Warheads & Materials, Stabilize Employment for Nuclear Personnel
- Monitor Stockpiles & Reductions, End Further Production
- Reduce Excess Stockpiles
- Interdict Nuclear Smuggling, Stabilize Employment for Nuclear Personnel
- Interdict Nuclear Smuggling
- Stabilize Employment for Nuclear Personnel

**GLOBAL WAR ON TERRORISM TASKS**

- Address the Root Causes of Terrorism
- Secure Timely & Effective Information & Intelligence
- Disrupt Terrorist Operations
- Deter States from Supporting or Complying with Terrorists’ Activities
- Block Financial Flows to Terrorists
- Eliminate Safe Havens for Terrorists
- Destroy Terrorist Networks

**HOMELAND SECURITY RESPONSE**

- International Law Enforcement
- Overseas & Domestic Intelligence Agencies
- Domestic Customs & Border Security
- Federal, State, & Local Law Enforcement
- Nuclear Emergency Support Team (NEST)
- Nuclear Emergency Support Team (NEST)
- Incident Management Response & Recovery
One potential terror chain…

Potential thieves and terror group strike a deal

Thieves steal material

Material transferred to terror group -- crosses borders

Terror group processes nuclear material, fabricates bomb

Bomb smuggled to target country

Bomb delivered to target, detonated
Multi-layer defense – focusing on key adversary choke points

◆ #1 priority: prevent theft of potential nuclear bomb material
  – Once the material has left the facility where it is supposed to be, it could be anywhere, challenge mutiplies a thousandfold
  – Preventing theft is a large but do-able mission – potential bomb material exists in hundreds of buildings around the world (not tens of thousands or millions)

◆ #2 priority: information/incentive warfare to encourage adversaries to inform, weaken adversary “market”

◆ Only then does division into land/sea/air interdiction modes become important
Encouraging adversaries to inform

- Known successes in seizing stolen HEU or Pu predominantly *not* from border detectors, but some one informing – often as thieves are trying to find a buyer. “Human factor” – individual who proves unreliable – is the weakest link, both for the good guys and the bad guys.

- Hence highest-leverage post-theft point is strengthening the good guys’ human factor, weakening the bad guys’:
  - Adequate pay for nuclear workers, guards, and effective training (including on dangers of nuclear theft and terror)
  - Toughen penalties for nuclear theft and collaborating with thieves – and widely publicize those penalties
  - Create easy means for anonymous reporting, make sure everyone knows about them – global “WMD 911”
  - Offer substantial, well-publicised rewards for information leading to preventing a nuclear theft, recovering stolen material
Intelligence and police operations to smash nuclear smuggling rings

- Making reliable connections between those who want nuclear bomb material and those in a position to steal it has proved difficult in the past – “market” is weak
  - Difficult to find each other
  - Both buyers and sellers fear stings and scams – difficult to establish *bona fides*, even once initial contact made

- A good defense should seek to make this connection more difficult, catch those exploring this market
  - Demand stings (posing as potential nuclear material buyers)
  - Supply stings (posing as potential nuclear material sellers)
  - Expertise stings (posing as providers and seekers of nuclear expertise)
Expanded police capabilities, int’l police + intelligence cooperation

- Programs should be put in place to ensure that every relevant country has:
  - 1 unit of national police trained and equipped to deal with nuclear smuggling cases
  - All local and other police/intelligence forces informed as to who to call in such a case
  - Access to high-quality nuclear forensics facility to send seized material to

- **Substantial** increase in international police and intelligence cooperation needed on nuclear theft and smuggling – to at least the level of in-depth cooperation now present on counter-terrorism – as threat is transnational
  - In-depth cooperation with Russian FSB in particular difficult but essential to success (some successful FBI, CIA cooperation in other areas under way)
Establishing a global NEST capability

- Nuclear Emergency Support Teams a crucial capability domestically – essential to confirming that hoaxes are not real threats, having at least some capability to find and disable a real threat (if we know where to look)

- Search for remains of Cosmos 954 in Canada proved NEST’s ability to operate internationally

- But, should put high priority on ensuring all needed arrangements in place for rapid deployment anywhere in the world – including visa exemptions, accords on import of detectors containing radioactive sources, etc.

- May be desirable to undertake NEST cooperation with Russia and other leading nuclear states
Nuclear land/sea/air interdiction – a tremendous challenge

- Length and complexity of borders, huge scale of traffic across them, small size and signature of nuclear material, all make job extraordinarily difficult – some investment desirable, but these layers of defense will always be porous

- 1000s of tons of illegal drugs, millions of illegal immigrants, come into United States every year, despite billions of dollars invested in stopping them

- Even if appropriate training and equipment provided, corruption is a key problem with border and law enforcement forces in many of the most critical countries
Nuclear material is not hard to carry – plutonium box for first-ever bomb
Interdiction: need for a systems approach, focused on adversary adaptation

- Need total *system* design and approach
  - “How well can this detector at this crossing point detect HEU?” is only one small (though important) part of the question
  - Rather, need to understand total system effectiveness, in the presence of intelligence adversaries’ efforts to get around it
  - Extensive red-teaming essential, to identify plausible tactics to get around defenses, options for closing those loopholes

- Example: may be possible (and worthwhile) to make it difficult to get an assembled nuclear bomb into the United States in a cargo container. But:
  - Air: what about flying it in on an uninspected Cessna or helicopter?
  - Sea: what about sailing it in in the hold of a yacht?
  - Land: what about bringing ready-to-assemble components in, in backpacks, through wild border areas (e.g., Minnesota “boundary waters”)
Interdiction:
thinking through adversary responses

- Example: portal monitors installed to scan 100% of containers destined for U.S. at a foreign “megaport”:
  - Can the adversaries avoid detection by shielding their HEU, putting it in a shipment that provides shielding, or creates heightened background radiation?
  - Bribe the monitor operator not to notice a “hit,” or not to scan one container?
  - Bribe the seal-emplacer to allow an object to be placed in a container after it has been scanned?
  - Defeat the seal (open the container, place an object inside, and reseal without this being detected)?
  - Bribe the seal-checker not to notice a tampered seal? (When does this seal-checking occur? How many seals are “naturally” broken?)
Preventing theft: Immediately needed actions

- Hundreds of tons of nuclear material in dozens of countries around the world is not yet secure enough to reliably defeat the threats terrorists and criminals have shown they can pose
- Step 1: Accelerated + strengthened U.S.-Russia partnership
  - Set agreed target of securing all warheads and materials in 4 years
  - Take actions to build effective “security culture,” put resources, incentives, organizations in place to ensure security is maintained
- Step 2: Fast-paced effort to remove potential bomb material entirely from world’s most vulnerable sites
  - Targeted packages of incentives to facilities to give up material
- Step 3: Global partnership-based effort to ensure all stockpiles in all countries secure, accounted for – forge stringent global nuclear security standard
A prioritized plan requires sustained White House leadership

- Today, dozens of programs in several Cabinet departments – some individually excellent – addressing pieces of the problem of preventing nuclear terrorism
  - no one short of the President in charge of all of them
  - inevitably leads to gaps, overlaps, stovepipes
  - no individual program important enough to get sustained high-level attention

- Urgent need for appointment of a senior White House official – with the access to walk in and get a Presidential decision when needed – to take *full-time* responsibility for keeping nuclear weapons out of terrorist hands

- Creating, implementing prioritized plan; finding and fixing obstacles to progress; eliminating gaps and overlaps; seizing synergies; keeping on White House front burner
For further reading...

- A major web section we maintain for the Nuclear Threat Initiative, *Controlling Nuclear Warheads and Materials*
  - [http://www.nti.org/cnwm](http://www.nti.org/cnwm)

- Includes our three most recent reports:
  - *Securing the Bomb: An Agenda for Action* (May 2004)
Backup slides…
Terrorists and nuclear explosives

- 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, as they are actively working to do)
Al Qaida nuclear bomb design
Summary: the nuclear terrorist threat

- Do terrorists want nuclear weapons?
  - Clear Bin Laden statements, some Chechen interest

- Is it conceivable terrorists could make a crude bomb if they got the material?

- Is there material that might be vulnerable to theft and transfer to terrorists?

- Is it likely that terrorists, if they had a crude device, could smuggle it to Moscow, Washington, or New York?
Moscow building with enough HEU for a bomb -- 1994
The threat in Russia today

- Russia is a different place today than 5 years ago – economy has stabilized; government in firmer control; nuclear workers paid a living wage, on time
- But, resources devoted to nuclear security remain far below what is needed – experts continue to report fences that are falling down, intrusion detectors that are not working, and other serious problems posing an immediate threat
- Four cases of terrorist reconnaissance on Russian nuclear weapons in 2001-2002 – two on storage sites, two on transport trains – whose locations and schedules are secret
- 41 heavily armed terrorists who seized a Moscow theater in Oct. 2002 considered seizing Kurchatov Institute – with enough HEU for dozens of nuclear weapons
Security culture matters: Propped-open security door

From GAO, Nuclear Nonproliferation: Security of Russia’s Nuclear Material Improving, More Enhancements Needed (GAO, 2001)
Not just a Russia problem

- Weapons-usable nuclear material exists in hundreds of buildings in more than 40 countries worldwide
- Security ranges from excellent to appalling -- no binding global standards in place
- >130 operational research reactors fueled with HEU in ~ 40 countries -- most with night watchman, chain-link fence
- Issues around the world: e.g., Pakistan (heavily guarded stockpile but extraordinarily high threat -- outsider and insider)

- Insecure nuclear material anywhere is a threat to everyone, everywhere -- homeland security begins abroad
Demonstrated outsider threats

◆ Large overt attack
  – e.g., Moscow theater, October 2002: ~ 40 heavily armed, well-trained, suicidal terrorists, striking without warning

◆ Multiple coordinated teams
  – e.g., 9/11/01 -- 4 teams, 4-5 participants each, well-trained, suicidal, from group with access to heavy weapons and explosives, >1 year intelligence collection and planning, striking without warning

◆ Significant covert attack
  – e.g., Indian incident with thieves drilling through wall for sources

◆ Use of unusual vehicles
  – e.g., helicopters used in many recent jail escapes
  – e.g., speedboat planned for use in $200M Millenium Dome theft
Demonstrated insider threats

- The desperate insider
  - Danger in Russia reduced with Russian economic stabilization (but still frequent incidents of minor theft by soldiers and sailors)

- The greedy/corrupt insider
  - e.g., recent conviction of Atomflot deputy director Tyulyakov for uranium trafficking -- countless other cases worldwide

- The ideologically sympathetic insider
  - e.g., case of Sultan Bashiruddin Mahmood in Pakistan

- The blackmailed insider
  - Chechens, others have used tactic of kidnapping a child of an official -- many other possibilities

- Outsiders and insiders may work together
Security can be simple and effective
Security can be simple and effective (II)
3 key foundations laid in past year

- UNSC 1540: creates binding legal obligation on all U.N. member states to put in place “appropriate effective” security for nuclear stockpiles (if any), controls on illicit trafficking, export controls…

- Global Threat Reduction Initiative: Consolidates, broadens programs to remove nuclear material from vulnerable sites around the world – Congressional action provides key authority to give facilities incentives to give up material

- Bratislava summit: U.S. and Russian presidential imprimatur on accelerated, expanded nuclear security cooperation

- But, sustained presidential follow-through needed to turn these opportunities into actions – chance could be fleeting
But much remains to be done: progress of U.S.-funded programs to date

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
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<tbody>
<tr>
<td>Comprehensive Security Upgrades on Former Soviet Material</td>
<td>26%</td>
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<td>Rapid or Comprehensive Security Upgrades on Former Soviet Material</td>
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<td>Comprehensive Security Upgrades on Russian Sites Containing Warheads</td>
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<td>Rapid or Comprehensive Security Upgrades on Russian Sites Containing Warheads</td>
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<td>Vulnerable Soviet-Supplied Non-Russian Sites with Material Removed</td>
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<td><strong>Interdicting Nuclear Smuggling</strong></td>
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<td>Key Border Posts Trained and Equipped to Detect Nuclear Smuggling</td>
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<td>Major Ports Shipping to the U.S. Trained and Equipped</td>
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<td><strong>Stabilizing Employment for Nuclear Personnel</strong></td>
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<td>Key Nuclear Weapons Scientists Given Short-Term Grants</td>
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<td>Excess Weapons Scientists/Workers Provided Sustainable Civilian Work</td>
<td>30%</td>
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<td>Russian Nuclear Weapons Infrastructure Eliminated</td>
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<td><strong>Monitoring Stockpiles and Reductions</strong></td>
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<td>Russian Nuclear Weapons Subject to Declarations</td>
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<td>Russian Nuclear Weapons Subject to U.S./International Monitoring</td>
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<td>Russian Nuclear Materials Subject to Declarations</td>
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<td>Russian Nuclear Materials Subject to U.S./International Monitoring</td>
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<td><strong>Ending Further Production</strong></td>
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<td>Reduction in Russian Weapons-Usable Material Production</td>
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<td>Reducing Excess Stockpiles</td>
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<tr>
<td>Reduction in Russian Warhead Stockpile</td>
<td>30%</td>
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<td>Reduction in Russian Highly Enriched Uranium Stockpile</td>
<td>18%</td>
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<td>Reduction in Russian Plutonium Stockpile</td>
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All percentages listed are as of the end of FY 2004.
U.S. budgets for cooperation on nuclear warheads, materials, and expertise
The Bratislava summit

✿ Promising:
- Both Presidents call nuclear terrorism among the “gravest threats”, endorse accelerated and expanded cooperation
- Emphasizes key subjects – accelerated progress, security culture, converting research reactors, implementing UNSC 1540
- Creates Bodman-Rumiantsev committee for follow-through

✿ Disappointing:
- None of the key obstacles to progress (access, liability, contracting, visas, etc.) resolved
- No measurable targets and timetables to which either party can be held accountable
- No Russian commitment to sustain high security with its own resources after U.S. assistance phases out
- No security standards; no conversion of Russian reactors; Bodman-Rumiantsev committee likely to have limited power
Presidential commitment would move this agenda forward

- If President Bush and President Putin said to their governments:
  - “I want every warhead and every kilogram of nuclear material secured, as fast as it can possibly be done, but certainly in no more than 4 years. I’m appointing some one with the sole job of leading these efforts, and finding and fixing every obstacle that’s slowing them down – and they’ll be able to walk into my office whenever there’s a decision I need to make. I will make the tough choices to resolve the access problem, and any other problem slowing these efforts. I’m prepared to put another billion dollars beyond current budgets into the effort over the next few years. And I’ll fire anyone who I find slowing this down.”

- Then the job would get done – and quickly
What the President should do

◆ *Give this top priority and set firm goals:* New decision directive that would:

- Designate securing every warhead and every kilogram of weaponsusable nuclear material everywhere as a top security priority of the U.S. government and an integral part of the war on terrorism

- Set a goal of securing all nuclear material in the former Soviet Union, and removing all nuclear material from the world’s most vulnerable sites, within 4 years, ensuring high security for all nuclear stockpiles worldwide within 6 years.

- Appoint a senior leader, on the White House staff and with the President’s ear, with the full-time mission of moving this agenda forward
What the President should do

◆ Make nuclear security key focus of relationship with Russia, others:
  
  – Follow up Bratislava with accords setting accelerated timetable, resolving access issue, creating mechanism for finding and fixing obstacles, and including Russian commitment to resources to sustain security after U.S. assistance phases out
  
  – Forge a fast-moving global cooperative effort to achieve strengthened standards of nuclear security – global partnership against catastrophic terrorism
  
  – Issue to be addressed at every opportunity, at every level, until the job is done
  
  – ¼ of the level of sustained political engagement devoted to Iraq would be more than sufficient
After theft – what?

◆ *Overt* theft: will result in major effort to pursue thieves, recover material
  – New international cooperation needed to put stronger emergency capabilities in place

◆ *Covert* theft: we may not know until long after theft has occurred – makes response problematic
  – Should redouble international cooperation to make covert theft close to impossible – e.g., security cameras in all nuclear material areas, RFID tags on all material containers, etc.