

---

# Securing nuclear stockpiles in four years – budget and policy requirements

Matthew Bunn

Harvard Kennedy School

“Security for a New Century”

24 February 2010

<http://www.managingtheatom.org>

# 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

# What should the mission be?

---

- ◆ Achieve effective and lasting security for all nuclear weapons and stocks of plutonium and HEU worldwide within four years – while consolidating to the minimum number of locations
  - Effective = provides high-confidence protection against demonstrated terrorist and criminal capabilities
    - » Not only installed systems but effective security culture
  - Lasting = countries can and will sustain effective security with their own resources (and have effectively enforced regulations in place that require the necessary measures to be maintained)
  - All = not just in Russia and the former Soviet Union, not just in developing countries, but in all countries – global problem, and wealthy developed countries also an issue
  - Consolidating = reducing number of weapons and materials sites wherever possible, especially removing material from the most vulnerable, difficult-to-defend sites (such as civilian research reactors)

# What targets can we hope to meet in four years?

---

- ◆ Drastically reduce number of countries with weapons-usable nuclear material on their soil
  - >50% reduction may be possible
- ◆ Reduce number of locations where nuclear material exists
  - >30-50% reduction may be possible
  - Large-scale conversion or shut-down of HEU-fueled reactors
  - Further reductions will be possible beyond four-year period
- ◆ All remaining countries provide highly effective security
  - Safest countries: protect against insider, modest group of well-armed, well-trained outsiders (>1 team), range of tactics
  - Countries facing higher threats must protect against more
  - Countries such as Russia, China, India, could have highly effective national rules and procedures in place by end of four years
  - In Pakistan, success should include progress in reducing extremist threats – no nuclear security system can cope with unlimited threats

# Required budgets depend on strategy

## – but substantial funds will be needed

---

- ◆ Different approaches involve different U.S. costs
  - U.S.-funded security upgrades worldwide would be expensive
  - But for many countries, approach will be convincing them to upgrade nuclear security themselves
- ◆ *But*, to do more, faster, will cost more money
  - Paying for more reactor conversions
  - Paying for more HEU and plutonium removals
  - Paying for upgrading sites to higher standards of security
  - Paying for upgrading more sites
  - Offering incentives to convince sites to convert/shut down/give up their HEU
  - Expanding cooperation on regulations, sustainability, security culture to more countries

# Some highlights of the FY2011 nuclear security request

---

## ◆ GTRI:

- \$559 million (+\$225M, 67% boost from last year)
- Will fund accelerated HEU removals, reactor conversions, some additional security upgrades at HEU-fueled reactors and for radiological sources

## ◆ CTR:

- New \$74.5M line for “Global Nuclear Lockdown”
- Will fund regional nuclear security “centers of excellence”, dealing with irradiated HEU naval fuel in Russia, some sustainability in Russia

## ◆ MPC&A:

- +\$25M for expanded upgrades in Russia, non-FSU countries

*At least these amounts – and probably more – will be needed to have any hope of achieving the four-year goal*

**Total, Improving Controls on Nuclear Weapons, Material, and Expertise**

\$1,324

\$1,083

\$1,235

-\$89 -7%

+152 +14%

**Securing Nuclear Warheads and Materials**

639

506

669

+30 +5%

+163 +32%

Material Protection, Control, &amp; Accounting (excl. SLD)

Energy

358

217

202

-156 -44%

-15 -7%

Nuclear Weapons Storage Security - Russia

Defense

46

24

24

-22 -47%

0 0%

Global Threat Reduction Initiative

Energy

193

220

395

+202 +104%

+175 +80%

Nuclear Weapons Transportation Security - Russia

Defense

38

41

41

+3 +9%

0 0%

International Nuclear Security

Energy

5

5

5

0 0%

0 0%

**Interdicting Nuclear Smuggling**

385

315

311

-74 -19%

-4 -1%

Second Line of Defense (part of MPC&amp;A budget line)

Energy

267

213

198

-69 -26%

-15 -7%

Export Control and Related Border Security Assistance

State

46

41

44

-2 -4%

+3 +7%

WMD Proliferation Prevention

Defense

58

50

59

+1 +2%

+9 +17%

International Counterproliferation<sup>1</sup>

Defense

14

10

10

-4 -30%

0 0%

**Stabilizing Employment for Nuclear Personnel**

92

91

84

-8 -9%

-7 -8%

Global Threat Reduction Program<sup>2</sup>

State

57

64

61

+4 +7%

-3 -5%

Global Initiatives for Proliferation Prevention

Energy

31

24

19

-12 -39%

-5 -20%

Civilian Research and Development Foundation<sup>3</sup>

State

5

4

4

-1 -13%

0 +0%

**Monitoring Stockpiles and Reductions**

28

29

29

+1 +3%

0 0%

HEU Transparency Implementation

Energy

14

15

15

+1 +4%

0 0%

Warhead and Fissile Material Transparency

Energy

14

14

14

0 0%

0 0%

**Ending Further Production**

180

141

141

-39 -22%

0 0%

Elimination of Weapons Grade Plutonium Production

Energy

180

141

141

-39 -22%

0 0%

**Reducing Excess Stockpiles**

0

1

1

+1

0

Russian Plutonium Disposition

Energy

0

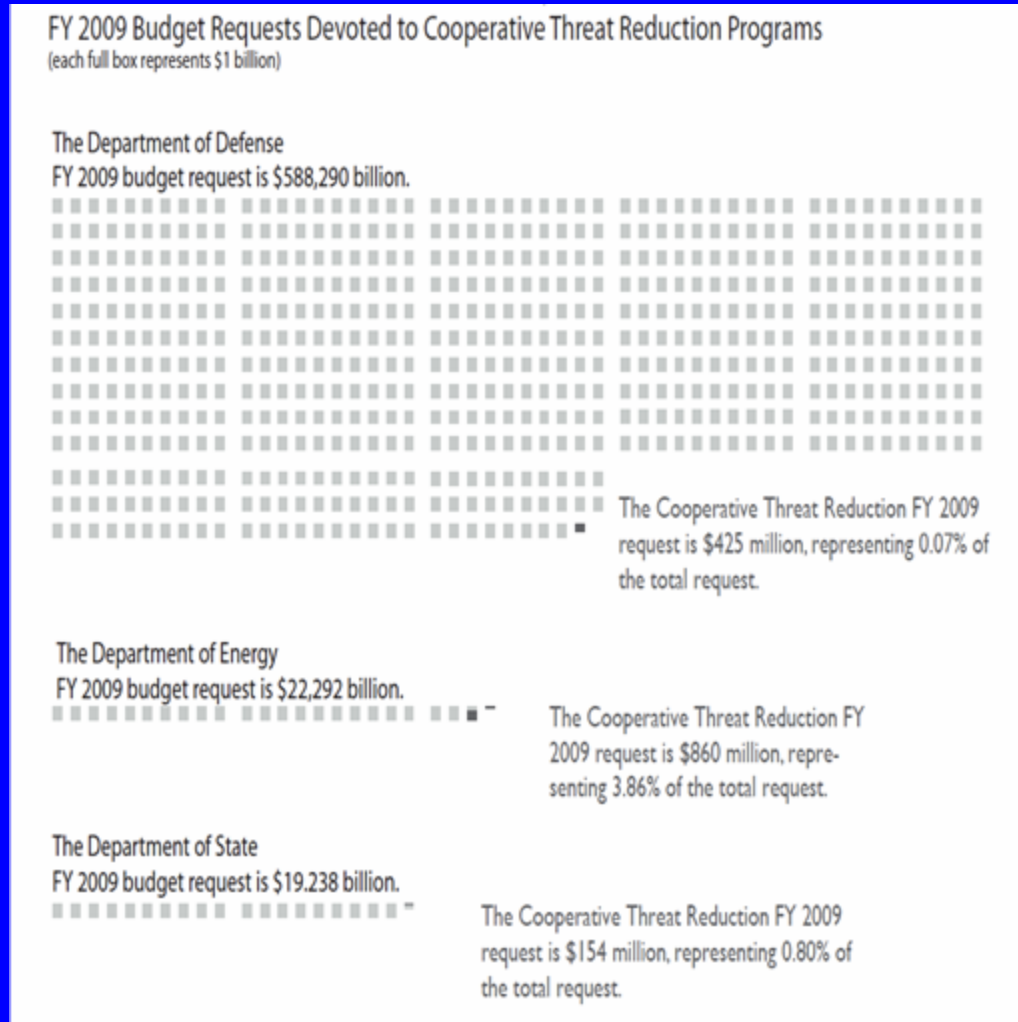
1

1

+1

0

# Cooperative threat reduction is a tiny portion of overall spending



Source: Author's estimates, described in *Securing the Bomb 2008*

# 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*

# 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

# Some opportunities for Congress

---

- ◆ Establish new incentives to move away from use of potential bomb material
  - Fund domestic production of medical isotopes without HEU
  - Require phase out of HEU exports
  - Stop imports of HEU-produced medical isotopes once sufficient supply of non-HEU medical isotopes available
  - Offer ~\$10K/kg for countries to ship out their HEU
- ◆ Mandating priority for intelligence support to reducing nuclear terrorism risks
  - E.g., collecting information on security conditions, terrorist and criminal activity, staff pay, morale, corruption at sites with weapons-usable materials – “how much do the people at this research reactor get paid? Is there a lot of organized crime there?”
  - NMIP making progress, but more emphasis on above issues needed

# More opportunities for Congress (II)

---

- ◆ Helping states implement effective controls required by UNSC 1540
  - Expanded programs to strengthen criminal laws, upgrade export controls, border controls, transshipment controls in many countries
- ◆ Modify mandate for 100% scanning of containers into systems-level approach – with “red teaming” to probe vulnerabilities – to make it as difficult as we cost-effectively can to get nuclear weapons and materials into United States by *any* routes
- ◆ Fund non-government analysis – small investments can lead to large returns in improved program effectiveness
- ◆ Support for effective nuclear forensics program – but realism as to what forensics can offer

# More opportunities for Congress (III)

---

- ◆ Mandating launch of particular new initiatives
  - E.g., U.S.-Russian reciprocal initiative—modeled in part on Bush-Gorbachev 1991 initiatives—to secure, monitor, dismantle 1000s of the most dangerous warheads (esp. tactical weapons without modern electronic locks)
- ◆ Ensuring effective security within the United States
  - Require similar security for HEU and plutonium, whether at DOE, DOD, or NRC-regulated facilities
  - Phase out security exemptions for HEU-fueled reactors (while directing DOE to pay resulting security costs)
  - Strengthen protections against insider threats
  - Mandate programs to regularly assess, improve, security culture
  - *Difficult to convince other countries to provide effective security if we fail to do so ourselves*

# The challenge

---

- ◆ Lugar Doctrine: war on terrorism will not be won until every nuclear bomb and cache of bomb material everywhere in the world is secure and accounted for to stringent and demonstrable standards

*On the day after a nuclear terrorist attack, what would we wish we had done to prevent it?*

*Why aren't we doing it now?*

# For further reading...

---

- ◆ A major web section we maintain for the Nuclear Threat Initiative, *Securing the Bomb*:
  - <http://www.nti.org/securingthebomb>
- ◆ Includes hundreds of pages of analysis, links, and databases, and our most recent reports:
  - “Funding for U.S. Efforts to Improve Controls Over Nuclear Weapons, Materials, and Expertise Overseas: a 2009 Update” (June 2009)
  - *Securing the Bomb 2008* (November 2008)
  - “Preventing Nuclear Terrorism: An Agenda for the Next President” (November 2008)
  - *Securing the Bomb 2007* (September 2007)
- ◆ For regular e-mail updates from *Managing the Atom*, write to [atom@harvard.edu](mailto:atom@harvard.edu)

# Backup slides if needed...

---

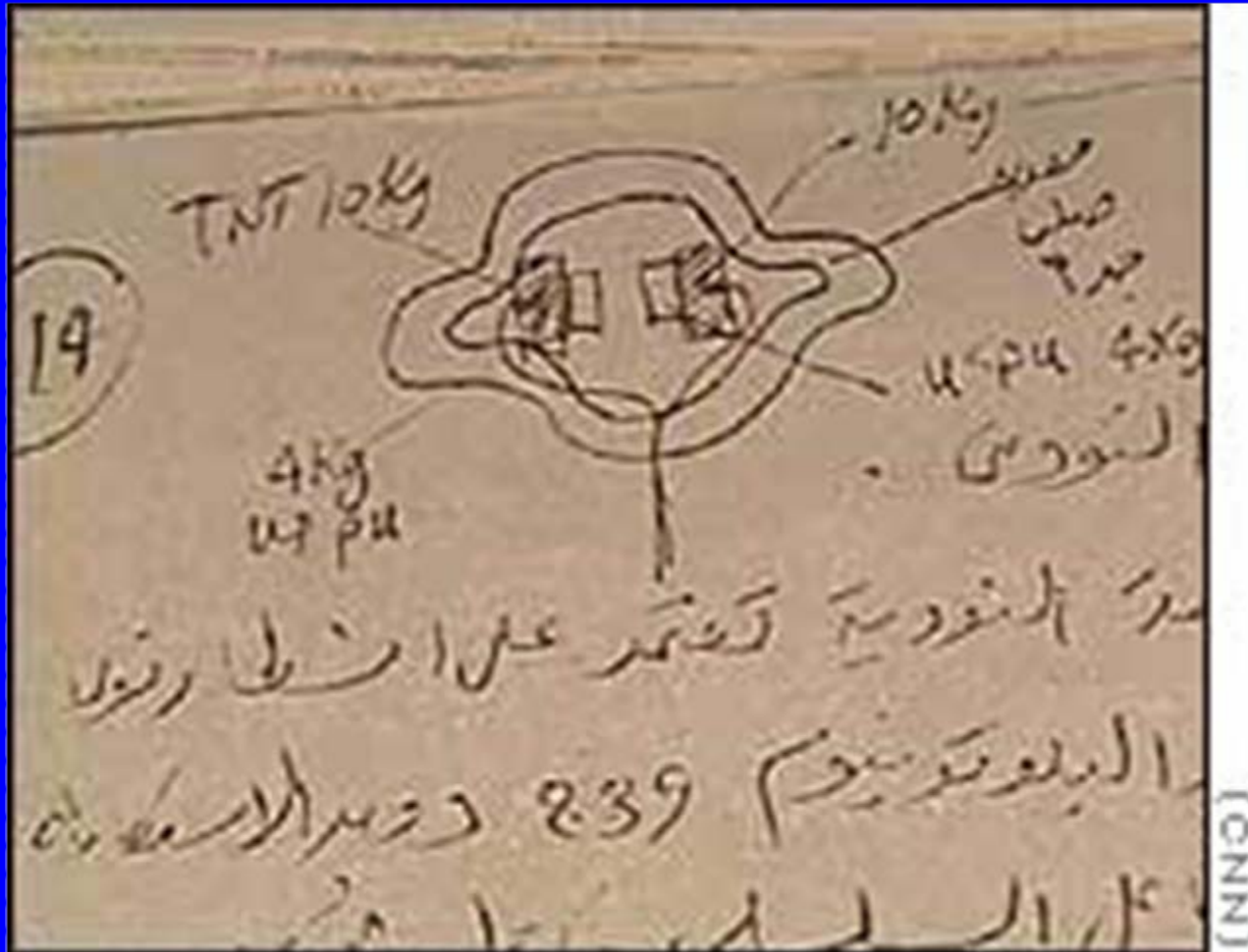
-

# What is the proposed solution?

---

- ◆ President Obama in Prague:
  - nuclear terrorism is the “most immediate and extreme threat to global security”
  - launching “a new international effort to secure all vulnerable nuclear material around the world within four years”
  - “we will set new standards, expand our cooperation with Russia, pursue new partnerships to lock down these sensitive materials”
  - Also “break up black markets, detect and intercept materials in transit, and use financial tools to disrupt this dangerous trade”
  - Turn Proliferation Security Initiative and Global Initiative to Combat Nuclear Terrorism into “durable” int’l institutions
  - *Nuclear security summit* – now scheduled for 12-13 April 2010
- ◆ Four-year nuclear security effort unanimously endorsed by UN Security Council Resolution 1887
- ◆ Nearly all countries with weapons material coming to nuclear security summit – a critical opportunity for progress

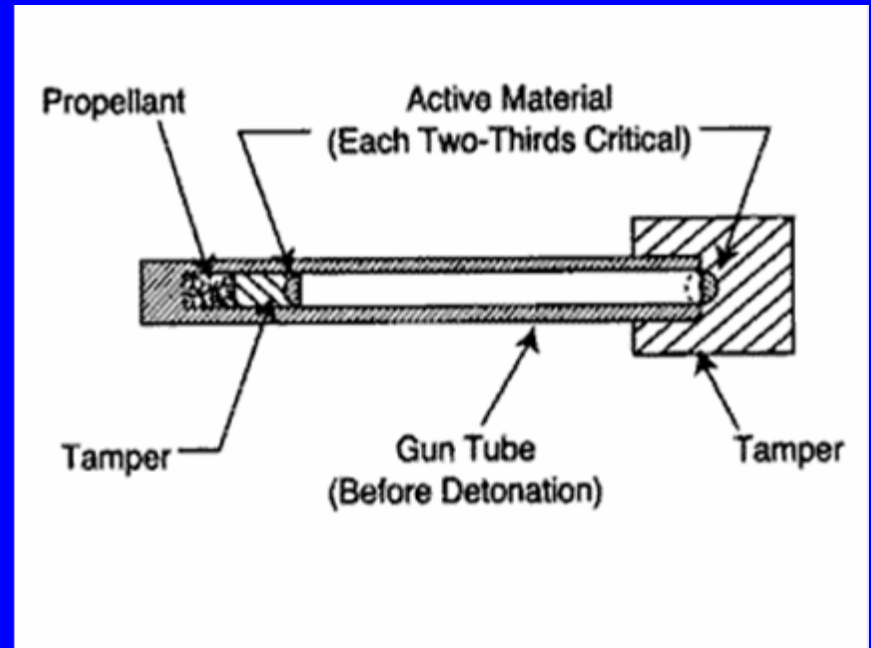
# Terrorists are seeking nuclear weapons – al Qaida nuclear bomb sketch



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

# Security culture matters: Propped-open security door

---



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

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

---



*Source: Los Alamos*

# Blocking the Terrorist Pathway to the Bomb

Source: Bunn, Wier, Holdren, Controlling Nuclear Warheads and Materials: A Report Card and Action Plan (2003)

