Protecting U.S. Nuclear Facilities from Terrorist Attack: Re-assessing the Current "Design Basis Threat" Approach

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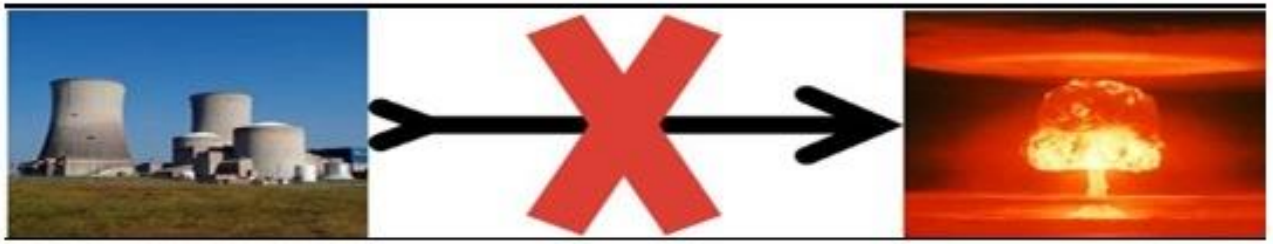

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The NPPP engages in research, debate, and public education to ensure that civilian applications of nuclear technology do not foster the spread of nuclear weapons to states or terrorist groups.

LATEST NEWS

U.S. Undersecretary praises new NPPP book on nuclear terrorism [Watch 40 second video]

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HELPFUL LINKS

- Endowment (NPPE)
- NCI Paper Archive
- NCI Website Archive
- UT-Austin Courses

New Book

Routledge, 2013

Outline of Today's Presentation

- **Critiques of NRC DBT Adequacy**
- **Critiques of DBT Variability**
- **Critiques of DBT Approach**
- **Alternatives to DBT**
  - Tiered Threat Levels
  - Security Culture
  - Game Theory
- **Critiques of the Alternatives**
- **Should the DBT Vary Among High-Value Targets?**
- **Recommendations**

Critiques of NRC DBT Adequacy

- **Adversaries**
  - Outsiders: NRC = ~5-6. (9/11 = 19; DOE = ~20)
  - Insiders: NRC = only 1-2 (armed), and don't test against simulated armed insiders
- **Weapons**
  - No RPGs or .50 cal sniper rifles (unlike DOE)
- **Air attacks** (excluded, for existing reactors)
- **Sea attacks** (excluded, unlike DOD)
- **Based on USG backup** (illusory)
  - 1.5 hours for SWAT team; minutes for meltdown

Critiques of DBT Variability

- DOE: DBT varies by facility type
  - lower at reactors
- DOD: DBT varies by facility
  - discretion of local commander

Critiques of DBT Approach

- Ignores strategic interaction

  →Defender's investments are suboptimal

- Unaffordable (especially in developing countries)

  →DBT is set well below maximum credible threat and/or is not defended against

Alternative 1: Tiered Threat Levels

- Rx: 3 Tiers
  - Level I – Protect against maximum, credible threat from a non-state adversary.
  - Level II – Protect against intermediate threat that is the most the country can afford to do.
  - Level III – Protect against a minimum threat defined by an international body.
- Critiques
  - Terrorism and proliferation have global consequences.
  - Advertises most vulnerable sites.

Alternative 2: Security Culture

- Rx: Training
  - Empower employees at facilities to actively participate in preventing security breaches.
- Critique
  - Only a complement, not a substitute, for traditional security measures.

Alternative 3: Game Theory

- Rx: Equalize adversary's expected payoff from each attack, which is a function of 3 factors –
  1. Probability that specific attack will succeed.
  2. Consequences if that attack succeeds.
  3. Value to attacker of those consequences.

Critiques of Game Theory

- **Theoretical Critiques**
  - All 3 factors are hard to know, especially #3.
  - Assumes attacker has perfect info, which in reality the defender strives to prevent.
- **Practical Critiques**
  - Requires central coordination of defenses against all, not just nuclear, targets. (Unrealistic)
  - Requires not defending against adversaries who have requisite capabilities but are judged not to value a specific target. (Unrealistic)

→ **Defender's investments will be suboptimal.**

- Perhaps less efficient than relying on DBT.

Should the DBT Vary Among High-Value Targets?

- Yes, if any of these is true –
  - Reliable intelligence about which facilities will be attacked;
  - High confidence that adversary would use smaller forces to attack certain high-value targets;
  - Reliable predictions about the relative consequences of various attacks; or
  - If USG provides backup protective measures that the DBT does not require of private licensees.
- But none of them is true.

Recommendations

- The DBT should be the same for all U.S. nuclear facilities – whether public or private – that pose catastrophic risks, whether from theft of nuclear weapons or fissile materials, or from radiological sabotage of a nuclear power reactor.
- The NRC could still accommodate the legal and financial limits on private security measures by subdividing the DBT into a smaller threat, which licensees would be required to defend against, and a larger threat that government forces would be required to defend against.