

# **From Attribution to Deterrence: Is Nuclear Forensics Effective Against Nuclear Smuggling and Terrorism?**

**S. A. Dewji**

Georgia Institute of Technology

Nuclear Science and Technology Division Seminar

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Contact: Kevin T Clarno ([clarnokt@ornl.gov](mailto:clarnokt@ornl.gov)), 865.241.1894 or Alice Rice ([riceaf@ornl.gov](mailto:riceaf@ornl.gov)), 865.576.2237

## **Abstract**

Nuclear forensics can be used to identify the origin of intercepted raw material for a potential nuclear weapon, or to identify the source and characteristics of a weapon through post-detonation sample analysis. Since the production of nuclear technology requires state resources, and nuclear forensics can be used to identify the source of sample materials, the state is accountable not only for the use of its weapons, but also for the use of its raw materials. In this way, nuclear forensics provides a deterrent to the use of nuclear weapons in general, in that states are responsible not only for their own use of their nuclear technology, but also can be called to account for it if nuclear material is traced back to them. Such state-based accountability has become the basis of Cold War deterrence theory arguably exercised by states today. This state-based accountability may provide a tangible target to deter non-state transnational terrorism and smuggling, which often lacks a return address for deterrence or retribution.

In addition to this traditional notion of deterrence exercised during the Cold War, current work by proponents of nuclear forensics strongly advocates this expertise and technology as an effective deterrent against nuclear smuggling or terrorism. This is an extension beyond traditional deterrence theory and raises a question: Although capable of attributing materials to a state facility, will nuclear forensics deter non-state actors from committing acts of nuclear terrorism? By further extrapolating renewed strategies of deterrence-by-denial through nuclear material trafficking interception, and deterrence-by-punishment against post-detonation terrorism, pundits are attempting to establish a global norm emphasizing that nuclear (especially fissile) material accountability ultimately falls on state stewardship. This deterrence strategy is a perturbation of that exercised during the Cold War because of state necessity in supply role. However, a nuclear forensics capability is not panacea for the deterrence of terrorism, but only a milestone point that must be addressed, and one must be vigilant when wanting to make states solely accountable in this respect, as it reveals gaping flaws in this renewed deterrence strategy. This study seeks to determine where the burden must fall for policy to make forensics attribution an effective deterrent tool against non-state proliferation and terrorism.

Although holding states accountable for their nuclear material may shift the paradigm towards greater accountability, this may not deter terrorist motivations, capabilities, or actions. This is especially evident in situations of clandestine collaboration with rogue states. Consequently, one must assess where the strengths can be harnessed in this deterrence regime, and where its limitations lay—technologically, strategically, and legally, as well as domestically and globally.