NO MONEY DOWN

Boost State Nuclear Forensics Capabilities With Less

Searching for smuggled nuclear material in a shipyard. If found, the material's chemical and other properties will be analysed to uncover information about its history.
(Photo: D. Smith/IAEA)

Any mention of boosting nuclear forensics capabilities can have governments clutching their wallets reflexively. That's because it sounds very high tech, and therefore very expensive.

In a time of austerity measures, countries can find it difficult to take on additional financial responsibilities, even when those responsibilities have to do with nuclear security.

But according to the IAEA's Office of Nuclear Security, becoming proficient in nuclear forensics isn't as expensive as it initially appears. Nuclear forensics is the science of uncovering the origin and history of nuclear materials, especially those found at a crime scene. "And every country can engage in a nuclear forensics examination, using existing technical capabilities that are readily adapted as part of a nuclear security infrastructure," says David Smith, IAEA Nuclear Security Coordinator.

"They already have the right analytical equipment — spectrometry and inorganic chemistry equipment, for example — in universities, regulatory bodies and mining companies, just to name a few places. And they have much of the expertise — trained technicians and law enforcement officials — but are unaware that putting these things together along with workable plans and strategies — that the IAEA can provide — can create an effective means for the practice of nuclear forensics."

Have a Plan

The key, says Smith, is to have a plan ready to be implemented in case of a nuclear incident.

The IAEA works closely with leading nuclear forensics laboratories, giving its members access to state of the art analytical facilities when investigating crimes.

If some nuclear material is seized at a border crossing, or found among discarded refrigerators in a junkyard, or used in a dirty bomb, national and local authorities must already have systems in place to contain this material and discover its origins. Law enforcement and security officials should already be trained in how to manage these crime scenes so that critical (often non-nuclear) evidence isn't lost or contaminated.

"Criminal cases involving nuclear material that has fallen off the government radar, we

say it's outside regulatory control, these cases are often won or lost based on the strength of the non-nuclear forensic evidence. Based on analysis of the lead container shielding the radioactive material, the type of glass vial encapsulating the material, or the mud on the fender of a car associated with a nuclear smuggling event," says Smith. "Authorities have to be prepared for this kind of evidence collection and this kind of analysis well in advance of an incident."

Experts advise that such plans and training need to be in place years before these capabilities are needed.

Get it Right

The IAEA's model plan of action in *Nuclear Forensics Support* (IAEA Nuclear Security Series No. 2) sets out in detail the steps that a country would need to take to get their plan in shape. This publication has been well received by States since its initial publication in 2006 and is currently being revised to reflect the latest advances and experience in nuclear forensics in support of investigations.

And for those States without nuclear analysis capabilities, the IAEA can facilitate introductions with institutions in countries that do have these capabilities. The IAEA works closely with leading Member State nuclear forensics laboratories as well as with a large network of partner international nuclear forensics laboratories. This network allows its members to have access to leading forensic experts and state of the art analytical facilities when investigating crimes. Some nations already have bilateral agreements with countries with significant expertise in nuclear analysis.

Sasha Henriques, IAEA Division of Public Information.

USING ATOMS TO SOLVE CRIMES
Basic Nuclear Forensics

Nuclear forensics is the analysis of the isotopic signatures, chemical properties, and physical features of nuclear or other radioactive material to uncover information about the material's origin and history. Nuclear forensics is used in national or international legal proceedings, such as criminal cases involving smuggling or terrorism.

Being able to tell (with certainty) where nuclear/radiological material came from and all the places it's been helps countries determine if there are any holes in their nuclear regulatory infrastructure. Sensitive and potentially dangerous materials like these can't be removed from authorized control, ending up in the hands of the public or criminals, if the regulatory system is functioning as it should.

Nuclear forensics is important because the results from a nuclear forensics examination are vital for law enforcement investigations, and help States to make informed decisions that will improve their nuclear security practices.

How does it work? Rather than requiring expensive new investments, nuclear forensics uses existing technical capabilities in the State, including analytical instruments, scientific expertise and radiological facilities maintained by nuclear operators, regulators, environmental monitors, or scientific institutes. The IAEA and its international partners have developed international guidance on how to conduct nuclear forensics examinations. This guidance is contained in the model plan of action.

The IAEA helps States with nuclear forensics by publishing technical guidance on how to conduct comprehensive nuclear forensics examinations. The IAEA also conducts generalized training to increase awareness and understanding of nuclear forensics, and trains practitioners to improve analysis at the onset of a nuclear forensics examination. Finally, the IAEA encourages each Member State to develop a nuclear forensics library and helps them develop a common structure for the organization of their information.