"Detecting Nuclear Weapons and Radiological Materials: How Effective Is Available Technology?"

Opening Statement

of

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Introduction

Good afternoon, Chairmen Linder and King, Ranking Members Langevin and Pascrell, and distinguished members of the subcommittees. I thank you for the opportunity to come before you today to share the progress we have made in developing and deploying new technology to protect the Nation from a terrorist nuclear or radiological attack.

My name is Vayl Oxford. I am the Acting Director of the Department of Homeland Security's newly created Domestic Nuclear Detection Office (DNDO). Additionally, I am currently serving as the Acting Director of the Homeland Security Advanced Research Projects Agency within the DHS Science and Technology Directorate. Prior to this, I have also held positions at the National Security Council and with the DoD's Defense Threat Reduction Agency.

Today, I will discuss several topics related to the use of technology in the detection of nuclear and radiological materials that could be used in a terrorist attack. Specifically, I will discuss the Department's formation of the DNDO and its nuclear detection deployment strategy, as well as current DHS deployments. I will also address the various detection technologies that we are currently working to develop and deploy and the program model that we are following, using the Advanced Spectroscopic Portal monitor program as an example.

Before describing the Department's efforts, I would first like to point out that protecting the United States from nuclear threats is a job that extends beyond the work of DHS, and I would like to thank my partners who are here today from the Departments of Defense and Energy for the contributions that their organizations are also making to develop and deploy technologies to protect the Nation.

Creating the DNDO

Combating the threat of catastrophic destruction and loss of life posed by terrorists possessing nuclear or radiological weapons is one of the most critical priorities of DHS. In order to integrate the Department's efforts against this threat under a singular direction, as well as coordinate these efforts with the partners with me here today and others across the government, Secretary Chertoff provided notification to the Committee on April 13 of this year, of his intent to establish the DNDO.

On April 15, 2005, the President signed a joint presidential directive establishing the office, NSPD-43/HSPD-14, "Domestic Nuclear Detection". This new office is chartered with developing a global nuclear detection architecture and acquiring and supporting a deployment of the domestic detection system to detect and report attempts to import or transport a nuclear device or fissile or radiological material intended for illicit use.

DNDO Detection Deployment Strategy

No single detection layer alone can prevent a terrorist from importing nuclear or radiological material with the intent to harm the Nation. Therefore, partnering with other government agencies and the private sector, we must create a well coordinated, robust layered defense with built-in redundancies.

While technology is a critical tool to combat terrorism, we recognize that this threat is not one that can be effectively overcome by technology alone. That is why we must work hand-in-hand with well trained Federal, State, Tribal, and local law enforcement agencies, as well as the larger intelligence and counterterrorism communities. Accordingly, while the DNDO is allocating considerable funding to technology research, development, and acquisition, we are also dedicating significant resources to the people and infrastructure required to develop a fully integrated operating environment. We will ultimately have the ability to fuse detection data and intelligence assessments in a near real-time environment to maintain an overall system and situational awareness. While this plan will require the DNDO to interact closely with the Intelligence Community as a developer of intelligence requirements and consumer of intelligence products, the DNDO will not act as an intelligence collection agency. This integrated approach to detection and information analysis will ultimately provide substantial improvement in alarm resolution, threat assessments, data trend analysis, and, most importantly, overall probability of mission success.

Current DHS Deployments

As next-generation technologies are being developed, the Department is already in the process of deploying several commercially available technologies to the field For example, U.S. Customs and Border Protection has made rapid progress with their Radiation Portal Monitor Program, which deploys commercially-available radiation detectors to the Nation's official Ports-of-Entry (POE). CBP has already deployed detectors to international mail facilities and major POEs along the Northern Border. Additionally, CBP officers are equipped with personal radiation detectors, pager-like devices that indicate the presence of radioactive materials. The U.S. Coast Guard has also begun deployments of these same personal radiation detectors and more-advanced handheld detectors for use in the detection and characterization of radiological materials.

Technical Approaches to Detecting Nuclear Materials

Recent reports have been published in the media questioning the overall capability of currently deployed detection equipment. Contrary to public perception that detection equipment is not sensitive enough, the actual primary limitation of today's systems is one of discrimination. Specifically, today's equipment lacks a refined capability to rapidly determine the type of radioactive materials it detects. Operationally, this leads to higher "nuisance alarm" rates—the number of alarms that must be resolved by further inspection. Because false alarm rates are a direct function of the probability of detection, the operators are being forced to make operationally-driven decisions when deploying and operating the currently available technologies.

To overcome these limitations, the DNDO is currently investing substantial resources to the Advanced Spectroscopic Portal (ASP) program, which is focused on developing detectors which will be able to discriminate between naturally occurring radioactive materials and true threat materials. So, rather than alarming when any radiation is detected, whether it is emitting from granite tiles or a nuclear weapon, these new systems will be able to determine, "yes, there is radiation present, but the radiation signature matches that of naturally occurring radioactive materials and not special nuclear materials or radiological threat materials, and, therefore, is not a threat." This level of discrimination will allow the systems to operate at a substantially lower detection threshold, while simultaneously offsetting the subsequent operational constraints associated with the current-generation systems.

However, "passive" detection systems are ultimately limited by the physical properties of the radiation that they are designed to detect, specifically with regard to range of detection. The problem is exacerbated by the fact that sufficient amounts of high-density "shielding" materials, such as lead or steel, can act as an effective measure to prevent the emission of detectable amounts of radiation.

Radiography systems, similar to x-ray machines, can, however, overcome this limitation by providing density images of the contents of a container to identify areas of high density that are potentially indicative of shielding materials. An integrated passive detection and radiography system would, then, be capable of either directly detecting unshielded materials that are emitting radiation, or detecting the materials used to shield materials and prevent radiation emission.

"Active interrogation systems" can further alleviate detection limitations by probing, or "interrogating," containers to induce additional measurable detection signatures. A number of methods are currently under investigation, including systems which "interrogate" containers with either neutrons or gamma rays. However, current systems are still in a prototype development and demonstration phase, and design and performance obstacles must be overcome to substantially reduce the size and cost of systems if they are to be widely deployed.

Research, Development, Test, and Evaluation to Advance the State-of-the Art

I would like to discuss in a little more depth the Advanced Spectroscopic Portal (ASP) program, which I mentioned previously, in order to explain the model that the DNDO will use for all technology development and acquisition programs. The ASP program was initiated in direct response to a CBP requirement for more capable radiation portal monitors to be deployed at the borders. The Homeland Security Advanced Research Projects Agency, or HSARPA, then issued two Broad Agency Announcements and awarded contracts to ten private industry participants for the development of these portals; these contracts have subsequently been transferred to the DNDO. These efforts will culminate late this summer with an extensive high-fidelity test and evaluation campaign to take place at the Radiological and Nuclear Countermeasures Test and Evaluation Complex (Rad/NucCTEC) at the Nevada Test Site (NTS), where the developed systems will be evaluated against one another, as well as currently-deployed systems. Based on the results of these tests, a limited number of vendors will be selected to begin initial low-rate production of detection systems to be deployed at the border. These first deployments will provide an opportunity for operational test and evaluation of the systems, the results of which will be provided to the design and production team for incorporation into subsequent spiral developments. This comprehensive technology development program will guarantee that capable radiation portal monitors with known performance characteristics are being deployed to implement the baseline domestic detection architecture.

This program highlights a unique DHS asset that I believe is critical to the overall success of the DNDO research and development efforts. The Rad/NucCTEC, currently under construction at NTS, has been developed to ensure a high-fidelity test and evaluation cycle for all technologies developed and transitioned to operational end-users. The facility is being built in close proximity to the Department of Energy's Device Assembly Facility, or DAF, to leverage its ability to handle significant quantities of special nuclear materials (SNM). The RadNucCTEC will be authorized to handle SNM for the purpose of testing developed technologies against actual samples of these materials which provide the greatest threat to the Nation for use in a nuclear attack. Until the construction of this facility, no location existed which allowed access to these quantities of materials while maintaining the flexibility to place these materials into relevant threat scenarios and cargo configurations. Once completed, the complex will provide the Nation with a unique capability that will bridge the gap between "bench-top testing" preformed by developers and operational field testing conducted during pilot deployments.

Conclusion

The DNDO has taken an end-to-end approach to systems development and technology improvement. By integrating research and development efforts with a comprehensive test and evaluation program that ultimately leads to an informed systems acquisition and deployment process, the DNDO is working to provide the Nation with a continuously improving capability to protect against a terrorist nuclear attack.

The DNDO has taken a comprehensive approach to addressing the threat posed by a terrorist nuclear attack. This approach, which begins with focused research and development programs that culminate in high fidelity test and evaluation campaigns, provide the basis for the Department to make informed and justifiable acquisition decisions. Equally important, the DNDO recognizes that the deployment of these technologies must be done as part of a larger strategy, one that extends to overseas deployments executed by other agencies. Ultimately, all of these systems must be connected and work within an environment that responds to information obtained from intelligence, counterterrorism, and law enforcement communities.

I am proud to have shared with you today how the Department and its interagency partners will work within the DNDO to continue to make progress against this very real threat. I look forward to working with you on these subcommittees in a continuing effort to confront this threat to the Nation.

This concludes my prepared statement. With the committee's permission, I request my formal statement be submitted for the record. [Chairmen, Congressmen Langevin and Pascrell, and Members of the Subcommittees, I thank you for your attention and will be happy to answer any questions you may have.