Opening Statement

Of

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"The Domestic Nuclear Detection Office Cost-Benefit Analysis

for Advanced Spectroscopic Portal Monitors"

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Introduction

Good afternoon, Chairman Langevin, Ranking Member McCaul, and distinguished members of the subcommittee. I am Vayl Oxford, Director of the Domestic Nuclear Detection Office (DNDO), and I would like to thank the committee for the opportunity to discuss how we are testing and evaluating next-generation technologies. In particular, I would like to describe the certification process, required by the FY 2007 Appropriations bill that the Advanced Spectroscopic Portals (ASPs) will undergo before we commit to purchasing and deploying the systems.

DNDO recognizes that there were concerns raised in the Government Accountability Office (GAO) report entitled, "*Combating Nuclear Smuggling: Department of Homeland Security's Cost-Benefit Analysis to Support the Purchase of New Radiation Detection Portal Monitors Was Not Based on Available Performance Data and Did Not Fully Evaluate All the Monitors' Costs and Benefits*," dated October 12, 2006. Nonetheless, we stand behind the basic conclusions of the cost benefit analysis (CBA). We realize there may have been a misunderstanding as to the intent of certain test series, the types of data collected, and the conclusions that were drawn. It is my hope that the information we provide today, including our path forward for the ASP program, is testament to the careful consideration we have given to our investments in ASP systems and, in turn, the GAO's concerns pertaining to next-generation technology.

I would like to make it clear that DNDO remains committed to fully characterizing systems before deploying them into the field. This is a founding principle of our organization and we maintain a robust test and evaluation program for this purpose.

Before I go into more detail about our test program and the upcoming certification of ASP systems, I would like to highlight some DNDO accomplishments which have occurred since I last appeared before this committee.

DNDO Accomplishments and Activities

As we continue to test and develop radiation portal monitors (RPMs) for use at our ports, we are also expanding security beyond our ports of entry. In FY2007, DNDO will develop and test

several new variants of passive detection systems based upon ASP technology. These include a planned retrofit of existing CBP truck platforms, commonly used at seaports, and the development and performance testing of an SUV-based prototype system suitable for urban operations, border patrol, and other venues.

The Systems Development and Acquisition Directorate is also executing the first phase of engineering development associated with the development of the Cargo Advanced Automated Radiography Systems (CAARS) system. A dominant theme within the nuclear detection community is that comprehensive scanning for smuggled nuclear materials requires both automated passive technologies and automated radiography systems. While ASP is DNDO's next generation passive detection system – providing an enhanced probability of success against unshielded or lightly shielded materials; CAARS will complement the ASPs by providing rapid automated detection of heavily shielded materials that no passive system can find. These two systems must function together to successfully detect nuclear threats at our Nation's ports. The three contractors selected by DNDO will proceed with system design and development efforts this year – including the development of many of the critical hardware and software components. DNDO, in coordination with Customs and Border Protection, will prepare the first CAARS deployment plan – describing in detail, where and how the CAARS units will be initially deployed, as well as a preliminary CAARS Cost Benefit Analysis and radiation health physics study.

DNDO also continues to develop handheld, backpack, mobile, and re-locatable assets with improved probability of identification, wireless communications capabilities, and durability. One specific goal is to deploy radiation detection capabilities to all U.S. Coast Guard inspection and boarding teams by the end of 2007. DNDO awarded contracts to five vendors in October 2006 for development of Human Portable Radiation Detection Systems (HPRDS), each of which will develop a HPRDS prototype unit. One promising HPRDS technology is the introduction of a lanthanum bromide detection crystal that may provide an extremely effective threat material identification capability along with a low false alarm rate. DNDO will also pursue research and development to standardize the flow of data to ensure rapid resolution of spectra acquired in the field, that need further validation as a threat or benign substance.

With regard to Advanced Technology Demonstrations (ATDs), DNDO will further develop the existing and proposed ATDs in FY 2007. We held the first preliminary design review of Intelligent Personal Radiation Locator (IPRL) on February 28th. Further critical design reviews of the IPRL ATD will be conducted in mid-FY08, to be followed by performance testing and cost-benefit analysis in late-FY08 and early-FY09. An additional ATD for Standoff Detection will also be initiated in FY2007. Under this ATD, various imaging techniques will be evaluated for sensitivity, directional accuracy, and isotope identification accuracy with a goal of extending the range of detection to as much as 100 meters, enabling a new class of airborne, land, and maritime applications.

The Exploratory Research program is continuing to work in support of future ATDs to understand and exploit the limits of physics for detection and identification of nuclear and radiological materials as well as innovative detection mechanisms. A few examples of exploratory topics include a new technique that would extend the ability of passive detectors to verify the presence of Special Nuclear Material (SNM) through shielding and creation of new detector materials that would perform better and cost less than current materials.

DNDO, in collaboration with the National Science Foundation (NSF), is beginning the Academic Research Initiative to fund colleges and universities to address the lack of nuclear scientists and engineers focusing on homeland security challenges through a dedicated grant program. A NSF survey shows a downward trend since the mid-1990s of nuclear scientists and engineers in the United States of approximately 60 per year. In 1980, there were 65 nuclear engineering departments actively operating in the U.S. universities; now there are 29. Currently, it is estimated that one-third to three-quarters of the current nuclear workforce will reach retirement in the next 10 years. Projections forecast the requirement for approximately 100 new Ph.D.s in nuclear science per year to reverse these trends and support growing areas of need. In order to address this requirement, the DNDO and NSF recently issued a solicitation for the Academic Research Initiative, which will provide up to $58M over the next five years for grant opportunities for colleges and universities that will focus on detection systems, individual

sensors or other research relevant to the detection of nuclear weapons, special nuclear material, radiation dispersal devices and related threats.

DNDO's Operations Support Directorate provided Preventative Rad/Nuc Detection training to 402 operations personnel in six state and local venues in FY 2006. We sponsored, designed, developed, and conducted the New Jersey multi-jurisdictional rad/nuc prevention functional exercise, Operation Intercept, in September 2006, with approximately 60 players (operators, law enforcement, fire/hazmat, intelligence analysts, etc.). DNDO's FY2007 goal is to train 1,200 State and local operators in Basic, Intermediate and Advanced Preventive Rad/Nuc Detection courses. DNDO Training and Exercises activities will also support DHS planning for the TOPOFF 4 full-scale exercise to be held in 4th Quarter FY 2007. DNDO is coordinating closely with other Federal agencies and State and Locals in developing radiological/nuclear scenarios.

The Southeast Transportation Corridor Pilot (SETCP) was initiated this past year to deploy radiation detection systems to interstate weigh stations. SETCP provided detection technologies (radiation portal monitors and mobile and handheld detection equipment) to five of the nine participating States in 2006, and this year we will equip the remaining states. Also, this year we plan to conduct a multi-state SETCP functional exercise using the weigh stations, the Southeast Regional Reachback Center, and the Joint Analysis Center (JAC).

The Securing the Cities (STC) Initiative is moving forward as we work with New York City (NYC) and regional officials (led by the New York Police Department) to develop an agreed-upon initial multi-jurisdictional, multi-pathway, defense-in-depth architecture for the defense of the NYC urban area. DNDO will conduct an analysis-of-alternatives for the deployment architecture, develop equipment specifications to address the unique needs of urban-area detection and interdiction, and develop and test these detection systems.

In FY 2006 a program to enhance and maintain pre-event/pre-detonation rad/nuc materials forensic capabilities was funded within the DHS S&T Directorate. That program transferred to DNDO on October 1, 2006. Concurrently, the DNDO established the National Technical Nuclear Forensics Center (NTNFC) to serve as a national-level interagency stewardship office

for the Nation's nuclear forensic capabilities. Staff for this office includes experts from DHS, DoD, FBI, and DOE. Agencies are working together in a formal interdepartmental forum consisting of a senior level Steering Group and Working Groups for centralized NTNF planning, integration, and assessment. FY 2007 planned accomplishments include developing a strategic NTNF program plan and associated concept of operations (CONOPs) for rad/nuc forensics. These documents will describe and detail the roles and responsibilities of, and interactions between Federal agencies involved in the detection, collection, and forensic analysis of radiological/nuclear material(s) and device(s). DNDO will also establish a National Technical Nuclear Forensics (NTNF) Knowledge Base. This knowledge management program will include the creation of a knowledge base and analysis tools to support the timely and accurate interpretation of nuclear forensics data and information sharing among partners.

Benefits of Next-Generation Detection Technology

Now, I would like to discuss the ASP Program and our efforts in reference to the Cost Benefit Analysis and the steps required for certification. Our desire to introduce next-generation radiation portal monitors (RPMs) into screening operations stemmed from inherent limitations in the current-generation polyvinyl toluene (PVT) detectors. PVT detectors can detect the presence of radiation but cannot identify the specific isotopes present. Currently, CBP relies on hand-held radio-isotope identifier devices (RIIDs) during secondary screening to provide isotope identification capability. Introduction of isotope identifying ASP technology in secondary screening applications will greatly increase the overall effectiveness of CBP screening. PVT portals installed for primary screening will effectively alarm on all sources of radiating material. This unfortunately includes nuisance alarms such as granite tiles, ceramics, kitty litter and other naturally occurring radioactive material (NORM). Next-generation technology will improve upon the identification capabilities of current systems, and minimize the diversion of trucks and containers filled with legitimate commerce to a secondary inspection area where CBP Officers conduct a rather time-consuming, thorough investigation prior to release of the vehicle. This technology will be especially important for high volume or high NORM rate POEs, as it will lessen the burden on secondary inspection stations and the associated impact to the stream of commerce and CBP. Spectroscopic systems, like ASP, that use the signature of the radiation to make a simultaneous 'detection and identification' decision provide one possible solution to this

problem. However, further development and testing is required to resolve some remaining issues concerning the use of ASPs in primary, such as the potential masking of SNM by a large NORM signature.

In accordance with DHS Investment practice, DNDO executed a classic systems development and acquisition program for ASP. Namely, DNDO implemented a program that consisted of concept evaluation, prototype development and test, an engineering development phase, a low-rate-initial production phase – and eventually a full-rate production phase.

During the concept development phase, DNDO issued a Broad Agency Announcement to industry – and competitively awarded ten contracts for the development of prototype units. DNDO then tested the prototype units in the winter of 2005, again during the concept development phase of the program, and used these test results as part of the competitive source selection process to select vendors to proceed with engineering development. Subsequent to the award of three ASP engineering development contracts to Thermo-Electron Corporation, Raytheon Corporation and Canberra Industries, DNDO directed the development of one ASP Engineering Development Model – or EDM – designed and built with the rigor necessary to be found suitable for production. Production Readiness Testing, including System Performance Testing against significant quantities of SNM at the Nevada Test Site, Stream-Of-Commerce Testing at the New York Container Terminal, and System Qualification Testing, which includes shock, vibration, and other environmental testing, is being conducted as we speak.

As I address many detailed concerns – I think it is very important to preface my statements by reiterating that the Winter 05 prototype test was never intended to be a production readiness test – nor a formal developmental test. The tests were designed to facilitate the competitive process by selecting those vendors that would receive further engineering development contracts, based in part, on the performance of their prototype systems. Much of the perceived confusion with regard to ASP performance stems from a miscommunication with regard to what the test results mean and what they do not mean and the complete evaluation process for ASP.

Cost-Benefit Analysis

Let me briefly address the ASP cost-benefit analysis. As I mentioned earlier, DNDO developed a first-cut cost benefit analysis (CBA) in the concept development phase of the ASP Program. Many DHS programs, such as ASP, produce a CBA in the concept development phase and subsequently update it as part of what the Department has referred to as Key Decision Point Three - the full-scale full-scale production milestone decision. An initial CBA (based simply upon studies, analyses, and modeling results) is required for all DHS investments during the concept development phase to determine whether further R&D investment is prudent.

The CBA fundamentally considered five different alternative configurations of radiation detection equipment at a CBP Ports of Entry. Specifically, the alternatives included:

#1 – referred to as the 'status quo' alternative consisted of the use of a current-generation PVT-based RPM in what is referred to as 'Primary Inspection' coupled with a second such system in secondary inspection – along with a current generation handheld device used for identification.
#2 – referred to as the "adjusted threshold' alternative; is identical to alternative #1 except that the PVT systems are set to their maximum sensitivity and, hence, experience the highest false alarm rate
3 – referred to as the 'enhanced secondary' alternative; consists of a current-generation PVT-based RPM system in primary with an ASP Portal in 'secondary'.
#4 – referred to as the 'hybrid' alternative where ASP systems are deployed in primary and secondary locations for high volume and high NORM rate POEs and PVT systems are used in Primary with an ASP in secondary for medium and low volume ports
And #5 – referred to as the 'All ASP' alternative; consists of placing ASP in both primary and secondary inspection areas.

Each alternative was evaluated on the basis of probability to detect and identify threats, impact on commerce, and soundness of the investment.

The preferred alternative recommended by the CBA was a hybrid approach consisting of ASP systems for primary screening at high-volume ports of entry (POEs), PVT systems for primary

screening at medium and low-volume POEs, and ASP systems for all secondary screening. The DNDO/CBP Joint Deployment Strategy describes the way in which the mix of PVT and ASP portals would be deployed to maximize the benefit of ASP, while minimizing the cost. We plan on initiating a phased installation by first installing the monitors for secondary inspection. This will allow CBP to gain operating experience and allow time to further evaluate the ASPs as a primary inspection tool.

DNDO met on multiple occasions with the GAO staff to discuss the CBA methodology, assumptions, data sources, and results and the fact that this was an initial CBA, suitable for the Concept Development phase of a program. We worked extensively with the GAO to further refine the CBA and provided written responses to the GAO documenting the technical rationale for DNDO's approach.

Nonetheless, confusion remained about our prototype test activities. Specifically, the GAO criticized DNDO for assuming a probability of detection of 95 percent, even though the Winter-05 test results did not show this same capability. Once again, as I mentioned above, the Winter-05 test results cited by the GAO were not intended to determine the absolute capabilities of deployed systems; rather, they were intended to support initial source selection decisions. We remain committed to high fidelity testing and are currently conducting a complete set of System Performance tests prior to ASP Full Rate Production.

The GAO reported that DNDO tested the performance of PVT and ASP systems side-by-side, but did not use these results in the CBA. Again, the test series referenced was not intended to provide an objective side-by-side comparison of PVT and ASP systems; it was intended solely to provide an objective side-by-side comparison of the competing vendors' prototypes. While the Winter-05 Tests were aimed at ASP source selection, it is the tests we are conducting now – the Winter-06 Tests – that are aimed specifically at assessing the cost-benefit associated with ASP and will therefore provide an ASP and PVT and Handheld side-by-side analysis that one would expect to see at this point in the program.

The GAO also stated that the CBA only evaluated systems' ability to detect highly enriched uranium (HEU) and did not consider other threats. DNDO agrees that threats other than HEU are equally important – and our Winter 06 test is evaluating the Production ASP units against a full set of Special Nuclear Materials – including those that might be used for an improvised nuclear devise and those that might be used for a radiological dispersal device.

We agree with the GAO that further test and evaluation of ASP systems must occur. Indeed, DNDO always planned on validating its assumptions through further testing prior to making a production decision.

Upon the successful completion of its ASP evaluation, DNDO intends to request Key Decision Point Three (KDP-3) approval – that is permission to enter full rate production of ASP - in the summer of this year. Our request will be based upon completed and documented test results from test campaigns to be conducted at NTS, NYCT, and at contractor facilities; as well as interim results from deployment integration testing to be conducted at the Pacific Northwest National Laboratory (PNNL) Integration Laboratory (frequently referred to as the 331G facility), and one or more field validation efforts in which an ASP unit is installed in "secondary screening" at an operational POE in tandem with existing approved interdiction systems.

The test results from this campaign will facilitate the Secretary's certification decision that is called for in the FY 2007 Homeland Security Appropriations Act (P.L. 109-295). DNDO will commit to full-rate production only after we are confident that ASP systems significantly upgrade our detection capabilities and operational effectiveness and that they meet the Department's goal to protect our Nation from dangerous goods. DNDO will use a combination of cost-benefit analyses as well as demonstrated performance metrics to assist in the Secretary's certification decision.

Contract Awards for ASP

As I have stated earlier, one of our major accomplishments this past year was issuing Raytheon Company – Integrated Defense Systems, Thermo Electron Company, and Canberra Industries, Inc. contract awards for engineering development and low-rate initial production of ASP

systems. Initial ASP contract awards totaled approximately $45 million. The priority for the base year is development and testing of the fixed radiation detection portal that will become the standard installation for screening cargo containers and truck traffic. The total potential award of $1.2 billion, including options, will be made over many years, based upon performance and availability of funding.

Future Deployment

DNDO intends to deploy ASP systems to the Nation's POEs based on the Joint Deployment Strategy I referenced earlier. In addition, ASP systems will be deployed overseas through the Department of Energy's (DOE) Megaports Initiative to work in cooperation with currently deployed PVT- based radiation portal monitors in those venues. DOE has purchased ASP units for use with MegaPorts from DNDO's existing contract.

Conclusion

DNDO is improving capabilities in detection and interdiction of illicit materials, intelligence fusion, data mining, forensics, and effective response to radiological or nuclear threats. It is the intention of DNDO to fully test and evaluate emerging technologies, in order to make procurement and acquisition decisions that will best address the detection requirements prescribed by the Global Nuclear Detection Architecture. We work with our interagency and intra-agency partners to ensure that deployment and operability of our systems enhance security and efficiency without unnecessarily impeding commerce.

We plan to work with the GAO to foster better understanding of our development, acquisition, and testing approaches and will share results of our testing with Congress. This concludes my prepared statement. With the committee's permission, I request my formal statement be submitted for the record. Chairman Langevin, Ranking Member McCaul, and Members of the Subcommittee, I thank you for your attention and will be happy to answer any questions you may have.