Opening Statement

Of

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Subcommittee on Investigations and Oversight

"Caught by Surprise: Causes and Consequences of the Helium-3 Supply Crisis"

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Introduction:

Good morning Chairman Miller, Ranking Member Broun, and distinguished members of the Subcommittee. As Acting Director of the Domestic Nuclear Detection Office (DNDO) at the Department of Homeland Security (DHS), I would like to thank the Committee for the opportunity to discuss the helium-3 (He-3) supply.

As requested, my testimony today will address the following points:

- How we became aware of the shortage of He-3;
- How we responded to it;
- What was done at the beginning of the Advanced Spectroscopic Portal (ASP) program to ensure there was an adequate supply of He-3 to meet the program's needs;
- The impact of the shortage on DNDO's radiological and nuclear detection programs; and
- The status of the work we are doing to identify alternative technologies to replace He-3 as a neutron detector.

Since National Security Staff has recently briefed the Committee staff regarding the He-3 shortage, I have limited my remarks today to DNDO actions related to He-3.

Helium-3 Supply

The United States' supply of He-3 has traditionally come from the decay of tritium, which the nation previously produced in large quantities as part of the U.S. nuclear weapons enterprise. The suspension of U.S. production of tritium in the late 1980s, however, resulted in a reduction in the amount of He-3 available for harvest. Currently, a significant portion of He-3 is used for neutron detection to aid in the prevention of nuclear terrorism. He-3 has become the overwhelmingly predominant technology used for this purpose; the Departments of Homeland Security, Defense (DoD), and Energy (DOE) each have nuclear detection programs that use He-3-based sensors. Additionally,

He-3 is finding increasingly widespread use in areas beyond homeland security, including scientific research, medical, and industrial applications. Some of these applications may require relatively large volumes of He-3 for which there may be no known alternative. In the past, He-3 was a relatively low-cost commodity, and its use increased particularly with the advent of large radiation portal monitors both domestically and abroad. The limited supply of He-3, which is based on the nation's current stores of tritium, has been overwhelmed by this increase in demand. The current and future He-3 supply will fail to satisfy the demand of interagency partners and the commercial sector. Only approximately one tenth of the current demand for He-3 will be available from DOE/National Nuclear Security Administration (NNSA) for the foreseeable future, and neutron detectors using He-3 are already becoming difficult to procure.

Since the inception of DHS in 2003, the majority of He-3 used was for the Radiation Portal Monitor (RPM) program. An RPM consists of a neutron detector, using He-3 gas in tubes, and a gamma detector, using large slabs of plastic scintillator. When DNDO was established in 2005, the RPM program was transferred from U.S. Customs and Border Protection (CBP). In FY 2006, when preparing to start a program for an advanced portal system, called the Advanced Spectroscopic Portal (ASP), DNDO met with DOE to discuss strategic resources that would be required for the ASP. DOE gave no indication that the supply of He-3 would be problematic, even with the amount of units we were envisioning.

Until recently, DHS acquired systems using He-3 by publishing an RFP and then reviewing responses to select a vendor or vendors. The bidders, in preparing their responses, would check the resources required to fulfill the order, including He-3. When this process was used at the beginning of the ASP program, none of the proposals indicated any issue with He-3 supply.

In the summer of 2008, DNDO first became aware of a potential problem with the He-3 supply through an email from a neutron detector tube manufacturer. Although DNDO investigated this issue, it was initially unclear whether the problem was a result of delays

in the supply chain or an actual shortage of He-3. DOE, which traditionally has been responsible for managing and allocating the supply of He-3, issued a report verifying the existence and seriousness of the overall supply shortfall in the fall of 2008.

In February 2009, DNDO took the lead in forming the He-3 Interagency Integrated Product Team (IPT), with participation of DOE/NNSA and DoD, to assess the true impact of the shortage and to ensure that the most critical government and commercial programs would preferentially receive He-3. The IPT also began exploring opportunities to manage the existing He-3 stockpile; increase the supply of He-3; account for the entire demand for He-3; investigate alternative technologies to replace He-3 for neutron detection; adapt old technologies for retrofit into existing equipment; and examine policy issues that may impact the use, distribution, or production of He-3.

The IPT took steps to secure the He-3 necessary for high-priority programs, which included the RPM Program. DNDO also began negotiations in late January 2009 to secure He-3 for the ASP and other DNDO programs. This He-3 sale, which would have covered initial deployments of ASP, was finalized in June 2009. In July 2009, DNDO ceded control of this He-3 purchase to the National Security Staff Interagency Policy Committee to be allocated in accordance with interagency determinations in order to optimally satisfy the competing needs of He-3 users. As the He-3 is allocated to other agencies and departments, DNDO will be financially reimbursed. DNDO has continued to coordinate with interagency efforts to manage the He-3 shortage and actively participates in interagency working groups to address He-3 supply, demand, alternative technologies, and policy.

Impact of the Helium-3 Shortage

Because of the volume of He-3 required in the construction of RPMs and the desire to make sure that He-3 was being used for the highest interagency priorities, DNDO ceased to allocate any additional He-3 for RPMs in September 2009. Based on current funding and guidance for the RPM Program, the He-3 shortage has had no appreciable impact on

the deployment of systems in FY 2010. The program has a sufficient inventory of RPM systems with He-3 tubes available to support deployments through FY 2011. Additionally, a number of solutions—including both the identification of new detector materials and management solutions to most effectively utilize existing supplies—are yielding results. If ASP units are certified for secondary scanning applications, DHS can reuse the He-3 from the existing RPMs that are being replaced and use it for the ASP units. Simultaneously, DNDO is leading interagency efforts to identify alternative neutron detectors that may eventually replace He-3 in these applications.

While other devices (for example, handheld radioisotope identification devices and backpack detectors used by the U.S. Coast Guard, CBP and the Transportation Security Administration) use smaller volumes of He-3, they are also impacted by this shortage. To mitigate the shortage and ensure supply to government customers, industry has been purchasing He-3 from other sources, such as private companies that have stored He-3, and recycling gas from obsolete equipment. This has offset some of the shortfall in the near-term, but a redesign of current equipment will be necessary over the next several years, once new neutron detection technologies have been identified. As such, DNDO plans to work with the device manufacturers to develop new technologies, integrate them into systems, and test them for suitability in the field. In the meantime, DNDO will also request modest allocations from the government stockpile to continue deployment of current human portable systems until alternatives are available.

Alternative Neutron Detection Technologies

As I mentioned earlier, the U.S. government is also exploring options to resolve this situation through the development of new types of neutron detectors. DNDO is at the forefront of these efforts and had been funding programs to address alternative neutron detection technologies as part of their mandate, prior to any knowledge of the He-3 shortage. We are also working with the interagency to engage the technical, commercial, and international communities to solicit ideas to address alternative materials for neutron detection. We are confident that the government, private industry, and international

stakeholders are making progress on a prudent path forward. At present, we are working with the commercial sector to identify alternative detection products that have potential for near-term commercialization. Our DNDO Exploratory Research projects that address other detection materials with neutron capabilities have also been accelerated.

DNDO recently tested many known commercial off-the-shelf (COTS) and near-COTS alternatives for neutron detection and remains committed to working with the interagency to identify potential solutions. For RPMs that require large volumes of He-3, four technologies have been identified as being potentially viable candidates. Boron Trifluoride (BF_3)-filled proportional counters were widely used for neutron detection before He-3-based detectors were available. DNDO conducted testing at a national laboratory to compare the performance of BF_3 with the performance of He-3; while this testing validated the neutron detection capabilities of BF_3 as a low cost replacement technology, we continue to seek additional alternatives because the hazardous material classification of BF_3 makes it less attractive for end users.

Other promising technologies under development include Boron-lined proportional counters; Lithium-loaded glass fibers; coated non-scintillating plastic fibers; and a new scintillating crystal composed of Cesium-Lithium-Yttrium-Chloride, (Cs_2LiYCl_6) or CLYC, commonly pronounced “click”, that has both neutron and gamma detection capabilities. Some of these new technologies may have neutron detection capabilities that meet or even exceed the abilities of current He-3-based detectors. Before any alternative is commercialized, we will check the availability of the key components to avoid another shortage issue.

Since He-3 was widely available and relatively inexpensive until only recently, alternatives are still somewhat early in their development, although these development efforts have been accelerated in the last year or so. DNDO will continue funding of exploratory research and early development, testing of new COTS and near-COTS alternatives, and acquisition of samples of promising technologies for more extensive testing and evaluation.

Chairman Miller, Ranking Member Broun, and Members of the Subcommittee, I thank you for your attention and will be happy to answer your questions.