Testimony of David Huizenga
Assistant Deputy Administrator
for the Office of International Material Protection
and Cooperation
Defense Nuclear Nonproliferation
National Nuclear Security Administration
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Mr. Chairman and Members of the Committee, thank you for inviting me to testify before you today. I would also like to express my appreciation for the efforts of my colleagues from the Departments of State, Defense and Homeland Security. I will be discussing the role of the Department of Energy's National Nuclear Security Administration (NNSA) in the interagency effort to prevent a nuclear terrorist attack against this country. More specifically, I will focus on the role of my office, the Office of International Material Protection and Cooperation, as a part of this larger, coordinated effort.

The mission of the NNSA's Office of International Material Protection and Cooperation is to enhance U.S. national security by reducing the threat of nuclear proliferation and nuclear terrorism. We pursue this mission by improving the security measures protecting weapons-usable material and by enhancing radiation detection and proliferation interdiction capabilities at key transit points including international border crossings and large ports of call. My group implements these critical programs in Russia and other states of the former Soviet Union (FSU) and in other countries around the world.

The first goal of my office is to secure nuclear weapons and weapons-useable nuclear materials by upgrading security at vulnerable nuclear sites. We focus on efforts in the Russian Federation and other countries of greatest concern to U.S. national security. By working to secure nuclear material and weapons at the point of origin, we continue to make important strides toward denying terrorists and states of concern the essential element of a nuclear weapon: the fissile material. As you know, securing nuclear material is a top priority of the Bush Administration, and we have now completed security upgrades at over 75% of the sites containing nuclear materials and nuclear weapons in Russia and the FSU.

The second goal of my office is to prevent smuggling of nuclear and radiological material at international seaports, airports and land border crossings. The Second Line of Defense program or SLD is dedicated to this important effort. At the Committee's request, the SLD program will be the focus of my testimony today.

The SLD program has two parts. The Core Program focuses on securing border crossings in Russia and other former Soviet States, Eastern Europe, the Mediterranean region and other key countries. The second part of our SLD program, the Megaports Initiative, equips major international seaports with radiation detection equipment to screen cargo containers for dangerous materials.

Implementation of the SLD program involves deploying a suite of equipment including fixed radiation portal monitors and an associated communications system, as well as handheld equipment for secondary searches of shipping containers.

I would like to emphasize that the nuclear detection technology deployed by the SLD program is part of an overall system. This overall system includes site surveys to determine the best placement of the monitors at major transit points, and vulnerability assessments to determine the potential efficiency of this technology at the particular site. Once the technology has been installed, we perform extensive acceptance testing and calibration of the radiation detection monitors. We also work with the host country government to provide extensive training on the most effective use of the installed equipment. This training program includes specifics on incident response procedures, requirements for maintenance and technical support, and long-term sustainability planning. This systematic approach recognizes that the effectiveness of the installed equipment is fundamentally determined by how it is used on the ground by host country personnel. The very best equipment available is ineffective if it is ignored, incorrectly calibrated, improperly maintained or easily bypassed by corrupt or incompetent operators. Therefore, the fundamental objectives of the SLD program include ensuring that our equipment is operated properly and effectively by the host country. We seek to ensure that the host country understands how to maintain the equipment after U.S. assistance has ended. We also work to ensure that the equipment, particularly the communication system, is minimally susceptible to corruption at these foreign locations.

The centerpiece of every Core and Megaport installation is the radiation portal monitor or RPM. Currently, we deploy monitors that use plastic scintillators to detect gamma signatures and Helium 3 tubes to detect neutrons. The purpose of this technology is to detect special nuclear material (SNM), in particular plutonium and uranium enriched to levels of 20% or higher in the isotope U-235. Equipment targeting this SNM will also detect other radioactive materials suitable for use in radiological dispersal devices.

To understand how the RPMs work, it is important to understand the interface between the detector and communication system. Our communications systems will graph the gamma or neutron signal detected by the RPM and help the operators identify what type of alarm has occurred and where it seems to be located. If the RPM signals an alarm, handheld equipment is then used to further localize the alarm and to identify the specific radioisotopes that caused the alarm. Determination of the specific isotopes involved and their specific location is important because a number of common materials such as ceramic tile and kitty litter, in large quantities, may signal an alarm due to their relatively high concentration of radioisotopes. We call these

‘NORM’ alarms, for ‘naturally occurring radioactive material’ alarms. In addition, individuals who have recently had certain medical treatments involving radiation may trigger an alarm. In these cases, secondary inspections allow us to identify the actual nature of the alarm.

Distinguishing “NORM” and medical alarms from actual instances of illicit trafficking is one of a number of technological challenges facing the operators of this equipment, in any location. For this reason, there are a number of critics of U.S. efforts to deploy radiation portal monitoring both here at home and abroad. I want to be clear, however, at the outset that these portals have proven their value on many occasions and I expect that they will continue to do so well into the future. The gravity of the potential consequences of illicit trafficking in nuclear material requires that we employ all of the tools available to us now, updating and improving them as new technologies emerge.

Now to the challenges we all face in deploying this equipment. Serious concerns have been raised about the efficacy of RPMs in three key areas.

First, certain configurations of shielded highly-enriched uranium (HEU) can be very difficult to detect. This issue is of great concern. Intense work is ongoing in laboratories and commercial arenas to develop solutions to this challenge. The Bush Administration is making substantial investments in an interagency research and development (R&D) program in nuclear detection technology coordinated by the recently created Domestic Nuclear Detection Office (DNDO) at the Department of Homeland Security. I am sure my colleague from DHS will discuss these R&D efforts in greater detail.

Until these R&D efforts improve the detection of well-shielded HEU, the best solution is overlapping the use of existing RPMs in conjunction with imaging technology that reveal anomalies within a container’s contents. A trained operator can pinpoint areas of concern within a suspicious shipping container or vehicle using imaging technology and reveal a potential effort to shield HEU. Such imaging equipment is present or will be soon in many U.S. and foreign ports.

Once imaging technology reveals a potential anomaly within a container, the container can be searched, or an active interrogation device can bombard the specific area of concern with a neutron signal revealing more information as to the nature of the potential threat. These active interrogation devices currently exist as prototypes, and we believe they will become commercially available within the next few years. I would like to note that the combination of imaging equipment and RPMs is what DHS’s Container Security Initiative (CSI) and SLD provide cooperatively to foreign ports. Put another way, our joint efforts maximize the possibility of the detection of trafficking in nuclear materials.

The second technological challenge faced by users of portal monitors is finding ways to quickly and correctly distinguish 'NORM' alarms from actual illicit trafficking in nuclear materials in order to minimize the need for time and resource-consuming secondary inspections. International port operators and foreign governments as well as our own domestic ports are sensitive to the fact that these nuisance alarms can and do slow down the flow of traffic and commerce. We have developed number of ways to address this particular challenge. Energy windowing (EW) is a method that U.S. Customs is using to reduce the number of 'NORM' alarms so as to allow more effective deployment of RPMs. This approach entails specific algorithms that sort out alarms on the basis of the fact that norm alarms generally have higher gamma signals than special nuclear material. SLD currently uses a version of EW that works well on our monitors by which the monitors are configured for increased sensitivity to the low gamma energies of HEU. This approach also reduces the number of NORM alarms. We are currently working with Customs to compare these two approaches and to ensure the highest possible standards for effectiveness.

Another promising approach for resolving 'NORM' alarms is the development and use of spectroscopic portals. These portals essentially provide a means to identify the presence of nuclear material and to identify the type of radioisotope present by means of a fixed monitor. Although these portals will not, unfortunately, have increased "intrinsic" SNM sensitivity, they may be useful for quickly distinguishing alarms caused when approved or naturally occurring radioactive materials are found in cargo or vehicles. This potential increased operational effectiveness may allow the monitors to be set at a lower threshold, thus allowing for greater sensitivity. The potential improvement in sensitivity may or may not be significant. Until these monitors are completed and tested, it is impossible to know for sure. We are currently studying their use for secondary inspections in cases where a large spectroscopic portal will be more effective than the currently available hand-held identifiers.

Such spectroscopic portals are currently under development and will be tested by DHS later this summer. If these tests are successful, SLD hopes to work through DHS to procure a number of these spectroscopic portals and then put them in secondary inspection locations in selected ports around the world. Operational testing under real deployment conditions will help us determine the true effectiveness of the monitors in the field. We hope that providing more extensive field-testing for this DHS-led effort will be another exemplary example of US interagency cooperation in the area of nuclear detection. It is important to note that these spectroscopic portals are estimated to be approximately eight times more expensive than the RPMs currently deployed by SLD. Unfortunately, scintillation crystals with sufficient sensitivity and sufficient resolution to be effective in these spectroscopic portals are very costly and currently unavailable in large quantities.

SLD is deploying a specialized version of the spectroscopic detector as part of a pilot project in a selected port. In this effort, a straddle carrier stripped of its lifting equipment has been outfitted with plastic scintillators, neutron detectors, NaI detector systems (spectroscopic detectors), and other equipment to allow the modified straddle carrier to travel through rows of containers for successive screenings. We expect to learn more about spectroscopic detector capability from this specialized effort to solve the problem of transshipment, which is containers that don't come into a port through a gate, but rather are moved from ship to ship or ship to shore to ship.

This issue of transshipment leads into the third challenge that impacts the effectiveness of portal monitors - monitor placement. For these monitors to work, they must be appropriately spaced, and vehicles of all types must move through them within certain specified speeds. This is not generally a problem for gate traffic, but large ports may not be configured with choke points where portals can be effectively deployed to screen the transshipped cargo, which is moving through the port from one ship to another.

Such difficulties present serious deployment challenges. However, as we gain valuable implementation experience in a variety of environments and as new technology develops, we fully expect that our ability to screen cargo effectively will improve. R&D efforts may contribute to solving the current challenges we face. For example, in addition to the straddle carrier which is being implemented, a crane-mounted monitor may eventually be developed to facilitate the screening of transshipped cargo. We are also taking new and creative approaches to strategic deployment of RPMs and the technology that we do have at our disposal right now. For example, in addition to the large transshipment hubs, SLD is working to install equipment at feeder ports in designated high threat locations, where most of the traffic comes through the gate and can be screened entirely before it moves into the maritime system.

In confronting these challenges and developing solutions to them, SLD works closely with DHS. We are engaged in active cooperative efforts with several offices including DNDO and various components of Customs and Border Protection (CBP) including the Office of Field Operations and the Container Security Initiative. We routinely exchange information, data, and lessons learned with our counterparts in CBP. Additionally, we provide joint training courses at the HAMMER training facility at the Pacific Northwest National Laboratory for CBP officers and foreign customs officials. Commissioner Bonner and NNSA Deputy Administrator Paul Longsworth signed a Memorandum of Understanding on 12 April to formalize this relationship.

Let me address a final concern that has been raised about the portals - the variability in the detection capabilities of the portal monitors that are being deployed in domestic and international settings. Although DHS/CBP and SLD are deploying different portal monitor models, they target essentially the same amounts of material. Recent comparison tests conducted by DOE and DHS indicate that when SLD and CBP radiation detection monitors are set to operate at thresholds that would produce acceptable nuisance alarm rates in an operational cargo setting, they demonstrate similar detection capabilities. In other words, in operational settings, the two types of monitors are operating at similar levels of effectiveness.

I have attempted to address the issue of efficiency of technology while still keeping the place of the technology in perspective within the larger system of inspection, detection and identification. On that point, I would remind you of something that our trainers always remind both the U.S.

and foreign customs, border protection, and port authority officers during training at DOE facilities. Equipment supplements the skill of the officers but does not replace it. These officers must use all that they have learned about human behavior, suspicious activities and smuggling techniques and patterns in order to make technology most effective. Alert and effectively-trained officials in foreign and domestic facilities using the best equipment available will always be our strongest protection against illicit trafficking in nuclear materials.

I'd like to close by saying that, while we focused on technological challenges today, there is a lot these monitors can do: they can detect radiological materials, they can detect plutonium, and they can detect HEU. They can also detect shielded plutonium and many configurations of shielded HEU. They are proven to work in a variety of field conditions.

As an example, Nikolai Kravchenko, our counterpart in the Russian Customs Ministry, recently informed us that these monitors deployed along the Russian border recorded 14,000 "hits" last year. Some 200 of these cases involve potential attempts to smuggle nuclear or radiological materials. That's 200 cases they would not have discovered nor be investigating without these monitors that the Second Line of Defense program has installed.

Finally, I would like to reiterate the strong and deepening relationship with State, DHS, DoD and other agencies participating in this effort to improve our nuclear and radiological detection capabilities. We share the common objective of preventing terrorists and states of concern from obtaining and smuggling nuclear materials and work closely with other USG agencies in the implementation of the program. The unique capabilities of each Department and agency are being leveraged to accomplish this objective.

Thank you. I would be happy to answer any questions you may have.