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Office of Public Affairs Telephone: 301/415-8200

Washington, D.C. 20555-0001 E-mail: opa@nrc.gov

Web Site: http://www.nrc.gov

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SECURITY ISSUES ASSOCIATED WITH RADIOACTIVE MATERIALS LICENSEES

Peter B. Lyons
Commissioner
Nuclear Regulatory Commission

before the
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Introduction

Thank you for the invitation to join you here today. This provides another opportunity, in addition to our past interactions, to discuss issues of importance to the Health Physics Society. I also want to thank you for the honor of being selected as the G. William Morgan Lecturer. I am honored to be among those who previously were selected.

Let me start with some personal background, which for the last 40 years has involved work with a wide range of radiation and radiation-based technologies. My graduate training at California Institute of Technology focused on nuclear physics and its applications to astrophysics. From Cal Tech, I went to Los Alamos, where I spent my first 15 years supporting our nation's nuclear weapons test programs with extensive work in diagnostics at the Nevada Test Site. Whether developing and calibrating instrumentation for tests or working at the Site, it was a rare day when I wasn't working around or with ionizing radiation in some form. In later years at Los Alamos, I managed many projects that involved the same basic technologies.

After almost 30 years in Los Alamos, I was presented with an amazing opportunity to move to Capitol Hill to serve first as science advisor to Senator Pete Domenici, and later on the staff of the Senate Energy and Natural Resources Committee, chaired by Senator Domenici. During my 8 years on Senate Staff, I interacted on a regular basis with representatives of your Society.

With Senator Domenici's keen interest in our nation's energy security and his particular focus on the role that nuclear energy might play in achieving that security, I had many opportunities to help in the development of legislation that would advance relevant disciplines, including health physics, required for any future renaissance of nuclear power in this country.

Now at the NRC, my responsibility is, among other things, to promulgate, review, and enforce regulations governing civilian uses of radioactive materials. Many of you are involved in research that informs these regulations and some of you use radioactive materials that are regulated by the NRC. My NRC appointment is both a great honor and a demanding assignment, made all the more challenging in today's world by the concerns raised by global terrorism.

The traditional focus of the regulation of radioactive sources was the protection of workers and the public from their misuse or from accidents. Security measures were also a concern, but with the principal aim of preventing petty theft or accidental loss. The events of September 11, 2001, however, changed the way in which we must think about sources. Our perspective must now encompass the possible malevolent use of radioactive materials in weapons of terror. As a result, past practices must be modified to reflect the threat environment.

One of our concerns, of course, is that a high-risk radioactive source might be combined with conventional explosives and used in a radiological dispersal device (or RDD). Now as far as I know, RDDs are not part of the military arsenal of any country for the simple reason that they are not very good weapons. Our analyses verify that such devices would not cause large numbers of fatalities. However, RDDs might nonetheless meet a terrorist's objectives to cause panic and potential environmental contamination that could seriously disrupt normal activities in the affected area or cause significant economic impact. Thus, we must protect the public from malevolent use of high-risk radioactive sources.

The task is challenging because of the widespread use of radioactive materials throughout the world in medical practice, research, and numerous industrial applications. Moreover, domestic and international commerce in these sources is extensive, and existing controls on imports and exports, particularly for sources of low to moderate risk, are minimal.

Pre-September 11

Prior to 9/11, accidents such as those in Brazil (1987) where an abandoned radiotherapy machine containing 1400 curies of Cesium-137 was opened by junkyard workers resulting in four deaths and more than 244 persons being contaminated, and Estonia (1994) where a Cesium-137 Source was stolen from a radioactive waste facility which resulted in one fatality and four injuries, highlighted the risk from orphan sources and served as an impetus for several initiatives, both internationally and domestically. Those efforts were aimed at improving safety by recovering orphan sources as they were discovered and at increasing controls to prevent future orphan sources. The International Conference on the Safety of Radioactive Sources and the Security of Radioactive Material in Dijon, France (1998) led to the first draft of the International Atomic Energy Agency's (IAEA) "Action Plan for Safety of Radioactive Sources and the Security of Radioactive Material" (Action Plan).

From the Action Plan, further conferences and technical sessions led to the development of the IAEA "Code of Conduct for the Safety and Security of Radioactive Sources" (Code of Conduct). In addition, regional international, trans-border issues among Canada, Mexico, and the United States led to agreements prior to 9/11 to hold a series of so-called Trilateral Meetings. These Meetings were intended to establish protocols and coordination on several issues including enhanced communications regarding lost or stolen sources near borders, communications about trans-boundary shipments, and coordination of national positions on conventions dealing with radioactive materials.

In addition, the absence of a disposal path for Greater Than Class C (GTCC) wastes (including unwanted sources) led to the passage of Public Law 99-240, "The Low-Level Radioactive Waste Policy Amendments Act of 1985." That Act established the Department of Energy as the agency responsible for providing a disposal pathway and led to formation of their Offsite Source Recovery (OSR) Project Office.

For unwanted sources with activity below the GTCC threshold, the NRC and the Conference of Radiation Control Program Directors, Incorporated (CRCPD) had been coordinating efforts to identify orphan sources (those sources outside of regulatory control) and provide disposal paths. Those efforts led to the National Orphan Radioactive Material Disposition Program announced by the CRCPD in October 2001.

Post-September 11

As I've noted, the common thread for several pre-9/11 initiatives was the reduction of risk from orphan sources. However, many of these initiatives were still in progress on 9/11 and did not reach fruition until after the terrorist events. Much of this progress was due to the continued efforts of health physics professionals who have always recognized the risks from orphan sources.

Progress was also due to the renewed national and international focus on the overall risk of malicious use of radioactive materials by terrorists. This renewed focus is two-pronged. For sources under regulatory control, the focus is on increasing their security. For orphan sources, the focus is on identification, recovery, safe disposal, and increased controls designed to reduce opportunities for sources to become orphaned.

Post 9/11, the DOE and the NRC jointly developed a report to identify the quantities of concern for high-risk radionuclides, which later became instrumental in developing a national strategy for adopting and implementing the Code of Conduct.

Orphan Source Recovery

Increasing the regulatory controls to prevent or minimize the possibility of sources becoming orphaned is one-half of the equation of reducing the risk from orphan sources. The other half of the equation is identifying and recovering sources already orphaned. Internationally, the NRC has participated in orphan source identification and recovery by supporting IAEA recovery efforts, and providing technical input into prioritizing source recovery through DOE's National Nuclear Security Administration's International Radiological Threat Reduction Program (RTR).

The DOE's excellent RTR program is a post-9/11 effort that works in cooperation with foreign counterparts and with both U.S. and international agencies to locate, identify, recover, consolidate, and enhance the security of dangerous radioactive materials outside the United States. Successful efforts have included recovering radioisotope thermoelectric generators and other orphan sources in former Soviet Union republics.

The NRC works closely with DOE's OSR Project Office in helping identify eligible orphan or potentially orphaned sources. This activity is followed by the development of a mutually agreed upon prioritization plan based on risk from those sources. The NRC also works closely with the CRCPD helping to coordinate efforts and fund the Orphan Radioactive Material Disposition Program.

Code of Conduct for the Safety and Security of Radioactive Sources

The Code of Conduct is the IAEA's framework for international cooperation in reducing the risks from radioactive sources including orphan sources. Elements of the Code of Conduct that apply to the recovery or prevention of orphan sources are:

- development of a national source registry;
- modification of import/export programs to ensure better tracking of sources;
- control over orphan sources, including promoting awareness of orphan source issues among external stakeholders; and
- management of disused sources, including the establishment, where applicable, of agreements for the return of such sources to manufacturers.

On-going NRC Efforts on the Code of Conduct

The NRC has ongoing efforts to meet the commitments made by our Government's endorsement of the Code of Conduct. These efforts have resulted in new rulemaking for import and export controls for radioactive sources and the development of a national source tracking system.

Import /Export

Strengthening the import and export controls for high-risk sources was one of the primary tenets in the IAEA Code of Conduct. In June of 2005 the NRC issued revisions to 10 CFR Part 110, "Export and Import of Nuclear Equipment and Material." The final rule became effective at the end of 2005. These additional import and export controls add reporting requirements, and determinations that the parties importing or exporting high-risk radionuclides (whether sealed or unsealed) are authorized to conduct these activities by competent authorities in the respective country.

National Source Tracking

After 9/11, there were numerous requests for the number and types of radioactive sources that existed in the United States that could be of interest to terrorists. In addition, the NRC was issuing security advisories and wanted to ensure that they were received by the appropriate NRC and Agreement State licensees. Furthermore, working groups focusing on efforts to improve security of high-risk sources needed to know the numbers and types of such sources.

Attempts to respond to the need for this type of information highlighted that there was no central database for high-risk sources. The regulations at that time simply did not require tracking of sources. Instead, the NRC and some Agreement States issued licenses with total possession limits, not a possession limit for individual sources. Regulators relied on inventory, receipt, and disposal records for licensees to provide some aspects of a paper trail.

Post 9/11, these shortcomings were readily visible. Thus, the need and resolve for national source tracking was established. Based on the U.S. Government's endorsement of the Code of Conduct, recommendation from the DOE/NRC joint report, a mandate in the Energy Policy Act of 2005 (EPAct 2005) and an NRC commitment to Congress, there is now a firm path toward

implementation of a national source tracking system. However, the process of rulemaking and developing the system takes time and does not meet the nation's immediate information needs.

The short-term solution involved creation of an interim voluntary database relying on licensees to make good faith efforts to provide accurate information. Approximately 2600 NRC and Agreement State licensees were contacted to provide a "snapshot" inventory of discrete sealed sources that contained IAEA Category 1 and 2 sources and even Category 3 sources if there was a potential to have a large aggregation that would trip the Category 2 quantity. The response was outstanding. An interim database has been established and is currently being used to inform NRC efforts to improve security and better track high-risk sources. Until the national source tracking system is established, the interim database will be updated on a periodic basis.

The proposed schedule for implementing the national source tracking system reflects the need for rulemaking. A Proposed Rulemaking was issued for public comment in July of 2005. The final rule is scheduled to be published in August 2006 consistent with the EPAct 2005. After the final rule, there will be a phased implementation of the tracking system beginning in the spring of 2007.

When the proposed rulemaking was noticed, the Commission directed staff to solicit comments on the potential addition of Category 3 sources to the NSTS. To date, most of the comments opposed to the inclusion of Category 3 sources cite the increased burden that would be imposed on licensees and the NRC. Some comments, including the HPS position statement issued this month, favor inclusion of Category 3 sources; they note that these sources can be aggregated to levels well above Category 2 sources and that failure to include them will introduce a loophole. The Commission will deal with these differing points of view when the rule is finalized.

Security Measures

Additional Security Measures (ASM) have also been promulgated by NRC orders, such as those issued to panoramic irradiator licensees (June 2003) and source manufacturer or distributor licensees (January 2004). It is my understanding that during the development of these orders, the Health Physics Society played a key role in facilitating the comment process and a request for additional meetings. NRC also issued Radioactive Material Quantities of Concern (RAMQC) transportation orders to applicable licensees.

The radionuclides and the threshold limits in the RAMQC transportation orders were consistent with the IAEA Code of Conduct. These measures require background investigations, protection of sensitive information, license verification, documentation of domestic shipments and transfers, and intrusion detection and response systems. They also require the establishment of a security zone(s), access controls, coordination with local law enforcement authorities to ensure a timely response if needed, background investigations for certain employees, and protection of sensitive unclassified information. Implementation of these measures must be completed this month.

Involvement of Agreement States Enhancing Security

Another issue, which I learned about during my Senate service, involved the perspective of many States that they should play a strong role in security of sources, not just in safety.

This sensitive topic has been examined by the Commission in recent months. I believe that we have responded appropriately with an inclusive and thoughtful approach to involve the States and

achieve our common objective to enhance controls over certain radioactive materials while enhancing protection of public health and safety. The approach involves recognition of the integrated nature of safety and security. I believe that the Agreement States' response to this Commission initiative will further enhance the level of mutual trust and partnership between the Agreement States and the Commission.

Both NRC and the Agreement States will continue to issue the requirements, as new licensees are identified, for authorizations to possess material above the threshold quantities. The Agreement States will inspect and enforce the requirements for their licensees. NRC will continue to coordinate with the States to assure consistent implementation. As of December 2005, NRC and all 33 Agreement States had issued a legally binding requirement for increased controls.

Implementation of the Energy Policy Act of 2005

The enactment of the EPAct 2005 added NRC regulatory authority over certain types of radioactive material that were previously excluded – specifically, certain accelerator-produced material, discrete sources of radium-226, and certain discrete sources of naturally occurring radioactive materials (other than source material). In time, this will help provide a more coherent national framework for regulation of most radioactive materials. And because the EPAct 2005 provided the Commission with authority to grant limited time waivers, the Commission has been able to maintain the "status quo" with respect to regulatory responsibilities of the States through issuance of these waivers.

However, by February 2007, NRC must issue final regulations addressing the newly covered material. Issuance of the regulations will require each State to compare its regulatory program against NRC's requirements. NRC is consulting with the States and other stakeholders in developing these regulations and, to the maximum extent practicable, will use existing model State standards in promulgating the regulations.

The EPAct 2005 contained many activities, some of which require significant cooperation between NRC and the State Radiation Control Programs to accomplish. Recognizing this, the NRC established a multi-organizational Task Force to integrate the activities. Task Force members include representatives from the NRC and State Radiation Control Programs as sponsored by the CRCPD and the Organization of Agreement States.

The Task Force is chartered to develop a framework under which activities will be planned, managed, and implemented. The Task Force is developing a detailed action plan to ensure timely and complete implementation. Task Force responsibilities related to NRC regulation of **N**aturally occurring and **A**ccelerator-produced **R**adioactive **M**aterial (NARM) include: (1) the technical basis for the rulemaking to establish a regulatory framework for the expanded definition of byproduct material; (2) the transition plan required in the Act to assert the expanded regulatory authority and permit assumption of the authority by Agreement States; (3) development of guidance for the NARM rulemaking; and (4) regulatory program changes related to NARM.

We are hoping to make this transition as smooth as possible, both for regulators and licensees. In issuing the regulations, the Commission will also prepare and publish a transition plan describing the conditions under which States may continue to exercise authority over the newly covered byproduct material. The transition plan will provide that any Agreement between the Commission and a State covering byproduct material and entered into before the date of publication of the transition plan will be considered to include the newly covered byproduct material. Non-Agreement States that wish to

regulate the newly covered material have the option of making an application to the NRC for Agreement State status.

Research and Test Reactors

Before I close, I'd like to address one other area that many members of your Society probably have recently confronted. This involves the national attention focused by the ABC television network on the security of research and test reactors.

Long prior to 9/11, security plans and procedures were required of research reactors. These requirements employed a defense-in-depth approach, which enabled the licensee to detect, delay, assess, and respond to security events. After 9/11, the NRC ensured that numerous additional security-related measures were instituted at these reactors to enhance protection against facility sabotage or theft of nuclear material. In addition to these actions, the NRC re-assessed the security of the research reactors to further determine whether any additional security measures are warranted. Results to date indicate that there are no credible scenarios that could result in significant radiological consequences to the public.

As this audience well appreciates, the radiological consequences of an attack on research reactors would be low due to the small quantities of radioactive material present, the reactor structure and shielding designs, and the safety and security measures in place. Also, attempts to sabotage the facility or steal the nuclear material would trigger a rapid armed response and activate pre-established emergency response plans. Even if a sabotage attack were attempted against a research reactor, we are convinced that the potential for significant radiation-related health effects to the public is highly unlikely.

Late in 2005, ABC aired a "Prime Time" story related to research reactor security that portrayed many current practices at research reactors to be grave national security risks. However, our evaluations to date of these concerns have not concurred with most of the so-called "security vulnerabilities" identified in the program.

As one example, ABC showed that some doors to buildings housing reactors were open and unmonitored. However, the NRC verified that the specific doors in question are to publicly accessible classroom and office buildings, which are not required to assure adequate security of the reactor. Another example from ABC was that so-called "guards" were not always present or appeared to be asleep. However, the traffic control and monitoring personnel identified by ABC to be "guards" are not required or considered by NRC for security or any other regulatory purpose.

In our evaluations, each specific concern from ABC for each research reactor is being assessed through NRC's allegation review process. Based on these assessments, NRC continues to conclude that in most cases security plans, procedures, and measures are adequate to protect public health and safety from the potential radiological effects of research reactors. In one case, implementation of security requirements was not acceptable and the NRC is ensuring that corrective actions effectively address the problem.

Furthermore, we recently issued letters to each research reactor licensee to obtain additional information and re-emphasize our expectations for maintaining effective security in the current threat environment. The information we requested will help the NRC to re-validate that the existing security requirements, as supplemented by the additional security measures conveyed to the research reactor

community after 9/11, are implemented to help protect public health and safety. In addition, we have requested that ABC make any additional video or other relevant information they obtained during their study available to us in order for the NRC to ensure that all risk-significant items are addressed.

Based on our continuing review of site-specific security and our knowledge of the potential risks and threats, we continue to believe that the research reactors remain safe and secure. If as a result of the continuing research reactor oversight activities, any additional security measures are necessary to assure the health and safety of the public, the NRC will not hesitate to implement additional security measures as appropriate.

In conclusion, I want to commend the Health Physics Society for its national leadership in providing responsible, scientific evaluations of the real health risks presented by radiation and radioactive materials. During my service in the Senate and now during my service with the NRC, I have learned to value the measured, carefully developed opinions of this Society on issues of mutual interest. I look forward to many more years of these interactions.