



Partnerships for HEU Minimization

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Laura S. H. Holgate
*Vice President for Russia/New Independent States Programs
Nuclear Threat Initiative*

I'm grateful to this meeting's organizers for the chance to introduce the Nuclear Threat Initiative, describe some of our current activities, and to offer some suggestions for reducing global nuclear threats stemming from highly enriched uranium. A non-profit, non-government organization with a Board of Directors representing a dozen nations, NTI uses its own private resources to reduce global threats from nuclear, biological and chemical weapons. One of our founding notions is that the primary job in preventing nuclear terrorism is preventing terrorist access to HEU. The sad and frightening reality is that sophisticated terrorists, if they were able to steal or buy a football-sized amount of HEU, would be able to create a nuclear bomb equal in devastation to the weapon that destroyed Hiroshima. We have argued for five years that we are collectively not doing enough to limit this risk. Since our founding in 2001 by media mogul Ted Turner and former US Senator Sam Nunn, NTI has carried out a number of HEU-related projects totaling over \$10 million. Some examples include:

Serbia:

- Supporting the removal of 48 kg of HEU from the Vinca research reactor

Russia

- Developing a plan to accelerate and expand blending of excess HEU
- Creating an overview of risks and requirements for Russian domestic research facilities using HEU
- Designing an LEU-based fuel core for nuclear icebreakers

Kazakhstan

- Blending down 3 metric tons of HEU in fresh BN-350 reactor fuel
- Designing an LEU core for Alatau VVR-K research reactor

IAEA

- Developing a plan for removal of HEU from Russian-origin research reactors

Taking our experience in these projects into account, I would suggest several characteristics that contribute to the success of HEU reduction projects. As many have mentioned, political will is the starting point, but sometimes analysis and expertise can help achieve political will. The Alatau VVR-K is a case in point. The Kazakhstani were not prepared to commit to conversion in the absence of a solid core analysis that would confirm the maintenance of their reactor's capability. NTI's funding of the ISTC project to design an LEU core supported that, but so did DOE's willingness to support on-site code training at ANL for two of the INP scientists. In addition, NTI funded some related analysis by experts in the research reactor market that helped demonstrate that the INP would have more business opportunities operating in an LEU mode than in an HEU mode. This combination of analyses and expert support helped convince the head of the reactor to become an advocate of conversion. In each of these cases, NTI was recruited to join in an activity, or we identified organizations and individuals required to achieve the desired outcome; partnerships are a key element. As perhaps the most complex example, the initial memorandum of understanding on the Vinca project was signed by representatives of the US Departments of State and Energy, the US Embassy, the IAEA, the Serbian Ministry of Science, the Serbian regulatory authority, the IAEA, the Russian transportation firm, and NTI.

Another critical element of success is creativity and the ability to set up tailored implementation approaches. Depending on the project, NTI has set up contracts or grant agreements with and through the ISTC, the IAEA, Russian consulting firms, US technical experts and technical service providers, the Kazakhstani nuclear company, and other NGOs in the US and Russia. This flexibility and creativity is necessary to address the key issue that may be required to achieve agreement to move forward. I call this "excuse removal": systematically addressing all the objections until there is no way to move but forward. There have been instances when NTI has been willing to fund some of these incentives in special cases where the need is especially urgent, but in general, I argue that the US programs need to exercise their authorities more broadly and fund such incentives themselves. In the case of Vinca, it was a question of removing the spent fuel from the pool. For the BN-350, it was funding for the security upgrades required to transport and blend down the HEU. For the VVR-K conversion, NTI has offered to fund a new beryllium reflector and an upgraded safety system if and when Kazakhstan makes the decision to convert.

Ideally, the governments ought to be able to fund such requirements, but in some cases, the special role of a private sector entity has been the key to success. NTI and its staff had established relationships in many of the venues in which cooperation was needed, which made it easier to build on the trust and experience of our past successes. It is also true that our non-official status sometimes makes us a more comfortable partner than working through official channels. Our Russian colleagues were very direct about this in agreeing with us to proceed with a serious joint analysis of accelerating HEU blenddown after having produced an unconstructive study of the same question in official channels. Often, private sector entities can act more quickly than government programs: NTI was able to commit \$5M toward the Vinca project three days after having been asked by the

State Department to help out. I would argue that these conditions are very helpful in creating successful projects in such a sensitive area as HEU.

You can learn more about NTI and its activities on our web site: www.nti.org. Several previous speakers have already noted some of the analytical resources we have made available, many of them created by the Monterey Institute's Center for Nonproliferation Studies. You can also find there a wide range of information about nuclear security and nonproliferation.

At NTI, in addition to the steps we take ourselves, we are trying to encourage bold steps by others. I want to propose several steps that will move us closer to our shared goal of reducing the inherent risks of HEU.

1. Create a Global Norm Delegitimizing Civil HEU Possession and Use

The starting point for a truly effective global cleanout must be a shared sense that any use of HEU outside defense programs is to be phased out as quickly as practicable as a matter of national and international security. This need not mean a draconian or arbitrary cut-off date, but it must motivate and accelerate efforts to develop alternatives to HEU use. Without a global norm of this nature—based on principles of supporting nondiscriminatory access to training, research, and isotope production—arguments about convenience, economic impact, and a misplaced sense of prestige will continue to thwart efforts to reduce these threats. Much has been made in this meeting about the need for balance, and I believe we should follow the clear path shown by balancing the significant security and even technical benefits of minimizing HEU against the economic and other costs, which this meeting has shown to be minor and manageable. I commend Norway and its “Group of Seven” partners for their welcome efforts at the NPT Review Conference in May and again during the IAEA General Conference last year to achieve statements in support of HEU minimization, but even in the absence of strong opposition on substance, linked political issues prevented their adoption. We need to understand the intrinsic importance of measures such as this and rise above the usual diplomatic hostage-taking.

2. Conduct a Global Inventory and Threat Assessment

As far as my colleagues and I at NTI have been able to discover, there is no current, accurate, consolidated global inventory of HEU in civil use—not in the US Government, not in the IAEA, and not anywhere else. This lack of clear information about locations and quantities complicates the development of a prioritized threat assessment to guide decisions about near-term security upgrades and medium-term conversion/shutdown/removal options. Given the global scope of HEU use, the need to distinguish among threats and needs will be critical to a well-organized global initiative. The IAEA, combining its research reactor expertise and its International Physical Protection Advisory Service, would be the ideal mechanism for this urgent effort, but it must be empowered to do so by member states.

3. Accelerate Conversion to LEU

Conversion to LEU fuel is technically feasible for most US- and Russian-supplied research reactors, but many of these have not yet decided to convert. The primary obstacle to near-term conversion was found to be cost. When considered within the traditional realm of research expenditures, conversion may appear to be a low priority, but in the context of today's national security imperatives, this economic explanation is inadequate and dangerous. Resources must be allocated to accomplish these conversions as rapidly as possible. DOE recently announced its plans to convert university research reactors in Florida and Texas. This is an important step in the right direction, and appears to represent a new sense of urgency to remove dangerous material from vulnerable facilities, but further such steps must be taken by the US, Russia and others on a rapid time scale.

For those reactors for which LEU fuel is not yet available, fuel development programs must be expanded and accelerated. Similarly, development of LEU targets for isotope production requires renewed attention and resources, as does the isotope processing technology. We must not let purely economic factors undermine the elimination of unnecessary HEU transport and commerce.

4. Create Regional Research Reactor Centers of Excellence

Many operating HEU-based research reactors create costs and risks that outweigh their benefits. International support will be required to shut down and decommission some reactors, and manage any remaining fresh or irradiated fuel. In the course of such processes, technical communities should have guaranteed access to nearby reactor facilities to pursue research and training. This could be accomplished through the creation of regional centers of excellence in reactor operations, based on LEU fuel, high standards of safety and security, and a strong regulatory regime. Over time, a comparatively small number of high-quality regional institutions could provide the necessary research, training, and isotope production requirements for surrounding territories, and vastly reduce risks and challenges of redundant, aging, poorly secured, underutilized facilities.

5. Address Civil HEU in All Forms

Most attention to the civil HEU threats has focused on US- and Russian-provided research reactors, an important but nonetheless only partial population of facilities using HEU. Indigenously-fueled research reactors such as in South Africa, and Chinese-supplied research reactors also require attention, and I welcome the news we received at this meeting about conversion activities in South Africa and Ghana. Critical assemblies and other research facilities, fuel fabricators, icebreakers, fast reactors and potentially floating power plants are all sources of HEU. HEU in irradiated fuel and failed fuel elements must also be addressed, not to mention bulk material outside weapons programs. In other words, HEU in any location, any facility, and any form must be secured and/or removed. NTI has filled a critical niche by working with Kazakhstan to

remove and blend down fresh HEU fuel for the BN-350 reactor, now undergoing decommissioning. These three tons of HEU fuel are now completely eliminated, blended down under IAEA safeguards and transformed into a riskless commercial commodity.

6. Diversify Material Destinations

Current removal/disposition programs assume that HEU returns to its nation of origin. In some cases, this is clearly the most appropriate option, but in others, HEU may be better managed in nations or facilities other than those from which they came. US and other potential partners in these activities need to broaden their legal and regulatory mechanisms to permit import of any at-risk material that can be effectively stored or managed in their facilities. The blend-down facility in Kazakhstan I just mentioned could also provide some of the necessary services to address global cleanout.

7. Secure All HEU to World-Class Standards

However successful we may be in converting reactors and eliminating stocks, HEU will be in storage, use and commerce for at least a few more years—as we proceed toward phasing out civil uses of HEU, we must aggressively guard against illicit theft or diversion of this raw ingredient of nuclear terrorism. We must accelerate and expand existing international programs to secure HEU on an urgent basis. Those who guard HEU have to succeed every day, but would-be nuclear terrorists only have to succeed once.

Eliminating threats from HEU in civil use is achievable—given adequate political, technical, human and financial resources. In an era in which world leaders have agreed that nuclear terrorism is our single biggest security threat, we have no other option. As others have noted, a nuclear attack on anyone is a nuclear attack on everyone. The day after an act of nuclear terrorism, we will be asked, what could you have done to prevent it? I ask you today, why aren't we doing that now?