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Reasons for an HEU Code of Conduct

Since the launch of an initiative at the 2005 NPT Review Conference to minimize HEU in the civilian nuclear sector, CNS has been involved in a variety of initiatives to reduce the possession, use, and transfer of HEU, and the proliferation and terrorism dangers it poses. These initiatives, undertaken with the support of the Norwegian Ministry of Foreign Affairs, UK Foreign and Commonwealth Office and other foundations, initially focused mainly on negotiating formal restraints, but resistance by a small number of countries to this approach on economic and political grounds necessitated the pursuit of several different tracks. These include the development of an HEU code of conduct for states, nuclear operators, and other stakeholders to help them make a commitment to best management and security practices, as well as to end HEU use as soon as possible.

With the assistance of outside experts, CNS has facilitated the creation of a draft HEU code, drawing extensively on the technical findings of the June 2006 Oslo Symposium, RERTR meetings, IAEA experience, etc. It includes basic principles, more specific best practices, and could involve detailed technical standards in appendices to the code. The code could be adopted in whole or in part by interested parties, offering a broad range of voluntary options to advance the development of a global norm even when its more stringent elements may not be immediately realized by all parties. Past practice in the nurturing of various codes of conduct suggests that there are elements common to such codes, including the global public good, respect for governance measures, and scientific integrity, stewardship, and obligations. By focusing on language that captures these elements, CNS has to forged a draft code it feels will have wide appeal not only to government and industry stakeholders, but also to the public.

Talking Points

Q. *What are the key elements of the Code of Conduct?*

A. Commitment to eliminate or to convert civilian HEU-fuelled installations for which there is a continuing need to LEU fuels as soon as technically feasible and to encourage other parties to do the same; ending transfers of HEU except on an interim basis to facilities actively pursuing conversion to LEU; maintaining levels of physical protection, control and accounting concomitant with the risks; and promising to develop and maintain a strategy for the management and eventual elimination of HEU, to ensure the safe and secure use, storage and eventual elimination of the material.

Q. *Why is an HEU Code of Conduct needed?*

A. Although measures to secure and eliminate HEU are currently under way as part of commendable international initiatives, such as the G-8 Global Partnership and Global Threat Reduction Initiative, there are still huge stockpiles of HEU around the globe. Many of the remaining facilities are not likely to agree to conversion without political pressure. Further action is required to reduce the possibility that terrorist groups could gain access to HEU.

Q. *Why don't we just increase security measures to prevent theft?*
A. Many facilities were not built with security in mind: in universities, particularly, it is not realistic to install walls, guards, and other measures to protect HEU materials in line with the threats they pose. Since HEU can be used for the construction of a nuclear weapon without transmutation or further enrichment, it should be protected like a weapon (depending on the form and amount of material). However, this level of protection is extremely expensive and not likely to be created in many locations around the globe. While improving security is laudable, and a necessary interim measure, HEU elimination is the only sure way to prevent theft.

Q. Isn't there too little material for a weapon at most sites?

A. While some sites have as little as 1 kilogram (the significant quantity for HEU is 25 kg, though as little as 12-15 kg can be used to create a weapon), other sites have many hundreds of kilograms. Moreover, the possibility that material might be stolen at more than one site cannot be excluded. In order to facilitate the creation of an international norm against HEU use, it is important that HEU use everywhere be minimized, even when quantities are relatively small.

Q. Can terrorists really use HEU to create a nuclear weapon without extremely sophisticated equipment and knowledge?

A. Experts from DOE and Homeland Security have stated that an improvised, gun-type device can be created by a small group of non-state actors. In fact, a 100-pound mass of uranium dropped on a second 100-pound mass, from a height of about 6 feet, could produce a blast of 5 to 10 kilotons.[1]

Q. What kind of destructive power are we talking about?
A. An improvised nuclear device should not be confused with a radioactive dispersal device, or dirty bomb, which spreads radiation by means of conventional explosive. HEU can be used to create a nuclear chain reaction, resulting in a blast of some 5-10 kilotons (which can be compared to the 12.5 kiloton yield of the bomb dropped on Hiroshima in WWII).

Q. *How will a Code help?*
A. Currently, rules and common practices vary from nation to nation and facility to facility. But nuclear material stolen anywhere can be transported to other sites on the globe. Thus, each country is as vulnerable as the most vulnerable site in the world. Having agreed rules that define responsible behavior promotes national and

[1] Source: Professor Frank von Hippel, as cited in Matthew Wald, "Suicidal Nuclear Threat Is Seen at Weapon's Plants," New York Times, January 23, 2002, http://www.scribd.com/doc/211771/US-Nuclear-Weapons-Complex-Y12-and-Oak-Ridge-National-Laboratory-at-High-Risk.

global security.

Q. *But rules don't matter to bad actors.*
A. And laws are frequently broken. That doesn't make the laws irrelevant, or unimportant. Norms matter. They make it easier to pressure those who are not working for the common good.

Q: What do we have to lose from giving up HEU use?
A: New facilities can be designed to achieve their objectives without the use of HEU. Although some older research reactors have experienced a small reduction in neutron flux as a result of conversion to LEU, this has not prevented any reactor operations, including isotope production. Other reactor operators have reported improved performance after conversion because of accompanying modernization. In addition, computer models and other methods have taken the place of some needs previously met by HEU. For those very few cases where extremely high flux is necessary for the best scientific research, or for other special uses (such as developing HEU detectors), there could be a case for continued HEU use in a handful of sites worldwide. U.S. and international standards include a “unique purpose” exemption from conversion for a facility that requires HEU to attain certain objectives. The code allows for this--and in such cases, requires security similar to that at military facilities. However, the new ultra-high-density LEU fuel currently under development should mean that this exemption is no longer needed for research reactors. Another use of HEU, for the production of the medical isotope Tc-99m, is no longer technically necessary (LEU can be used). However, converting large-scale producers will take time and money. The code does not endanger this production: it encourages conversion but does not require the end of all HEU-based production until sufficient quantities of medical isotopes are available from other sources.

Q. What does this mean for consumers/patients?
A. Consumers will not be affected; indeed, given the current global reliance on HEU-based isotope production at just four reactors, including one in Canada that is already 50 years old, the creation of new, LEU-based production in the United States and elsewhere will actually improve reliability of obtaining isotope treatments. Tc-99m from LEU-based production has been shown to be of similar or better quality than HEU derived isotopes. Moreover, after the initial cost of conversion, patient costs will not increase.

Q. Will the HEU Code of Conduct affect my life?
A. We rely on isotopes for medical treatment and on research reactors for basic science and the development of new energy technologies. Ensuring that nuclear materials cannot be misused for weapons helps to guarantee that we can continue to benefit from the peaceful use of nuclear energy. Were a nuclear attack to occur, the existence of nuclear facilities as we

know them today would likely change. The Code of Conduct is designed to help make sure that never happens. A successful Code will have no noticeable affect on your life; it will make sure you can continue to enjoy the benefits of the atom without any of the potential negatives.

Q. Isn't nuclear terrorism inevitable?
A. Terrorist attacks may be inevitable, but the use of a nuclear device can be prevented. A nuclear weapon cannot be constructed without plutonium or highly enriched uranium. These materials are not widely available: enriching uranium or deriving plutonium from a nuclear reactor is difficult. That's why we have to prevent terrorists from accessing the HEU and plutonium currently in use and stockpiled around the globe. Since HEU is the material that would be most effective in a crude nuclear device, and is not technically needed in our world today, it is clear that its risks far outweigh its benefits. If we remove this material, there need never be a nuclear terrorist attack.