Technical Cooperation for Peaceful Nuclear Technologies: What are the Responsibilities?

Presentation for the Panel on "Technical Cooperation: Policy Considerations, and Challenges"

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Should countries that request nuclear technological assistance receive it without precondition? Would denying such assistance to countries that have violated their safeguards commitments or not even implemented a safeguards agreements be inhumane especially when a nuclear technology could eradicate harmful pests such as tsetse flies, could stimulate bountiful food production, or could provide radioisotopes for medical treatments? Is nuclear technical cooperation a right or a privilege?[2] To address this question, let me briefly review some salient historical events. Then I will discuss contemporary concerns.

Fissionable material contains a tremendous amount of energy. To make it available for peaceful purposes for the whole world was a vision of the United States six decades ago. In his "Atoms for Peace" speech on December 8, 1953, before the United Nations, President Dwight Einsenhower called for the creation of an Atomic Energy Agency that would have the important responsibility "to devise methods where by this fissionable material would be allocated to serve the peaceful pursuits of mankind. Experts would be mobilized to apply atomic energy to the needs of agriculture, medicine, and other peaceful activities. A special purpose would be to provide abundant electrical energy in the power-starved areas of the world."

In 1957, the International Atomic Energy Agency (IAEA) began and has since provided assistance via thousands of projects to more than 100 countries. The Technical Cooperation Program has become the main mechanism to bestow this assistance.

Certain nuclear technologies are inherently dual use in that they can be used for peaceful purposes such as making fuel for nuclear reactors or for military purposes such as producing fissile material for nuclear bombs. While arguably the vast majority of the assistance from the Technical Cooperation Program would not directly help weapons programs, some assistance would. For example, assistance in building certain types of reactors such as medical isotope production reactors that use highly enriched uranium—a

[1] I thank the Ploughshares Fund for support.
[2] For an article that provides a detailed examination of the IAEA's Technical Cooperation Program from this perspective, see Jack Boureston and Jennifer Lacey, "Nuclear Technical Cooperation: A Right or a Privilege?" *Arms Control Today*, September 2007.

weapons-usable fissile material or heavy water reactors that could be ideal for producing weapons-grade plutonium could pose proliferation risks. Indirect help for weapons programs could arise, for example, by the provision of certain computer codes that may be adapted for weapons design purposes and could occur via networking of scientists, some of whom might pass along information that may be useful for weapons development. Because of the awareness of the dual use nature of nuclear technologies, the IAEA also is responsible for safeguarding nuclear facilities and materials in peaceful nuclear programs.

In 1970, the Nuclear Non-Proliferation Treaty (NPT) entered into force and required non-nuclear weapon states to implement safeguards on their nuclear programs. A bargain within this treaty is that in exchange for implementing these safeguards the non-nuclear weapon states have "an inalienable right" to peaceful nuclear technologies under Article IV. Article III specifies the requirement for adequate safeguards. To sum up with a wise counsel that is popular with President Barack Obama: with rights come responsibilities.

Remarkably, however, although non-nuclear weapon states are required to form a comprehensive safeguards agreement within 180 days after ratification of the NPT, as of late December 2010, 17 states have not submitted, signed, or entered into force such agreements.[3] This situation was even worse in the past decade when a few dozen states had not entered into force comprehensive safeguards agreements.

Such safeguards, however, should be considered the bare minimum standard for NPT non-nuclear weapon states because a comprehensive safeguards agreement is usually interpreted to apply only to declared nuclear facilities and materials. The new, improved universal standard should become the Model Additional Protocol, which requires inspectors to assess whether a state has any undeclared facilities or materials. But only somewhat more than half of the world's states have implemented an additional protocol. As of late December 2010, 104 states have done such.[4]

But the IAEA has not required states to have comprehensive safeguards agreements let alone an additional protocol in order to be eligible to receive assistance through the agency's Department of Technical Cooperation. The possible proliferation connection to the technical cooperation program has not escaped notice of the U.S. government's watchdog. Two years ago, in particular, the U.S. Government Accountability Office (GAO) published a report titled "Strengthened Oversight Needed to Address Proliferation and Management Challenges in IAEA's Technical Cooperation Program."[5] This report followed a previous GAO report on this topic published in 1997.

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[3] Overview of the Status of NPT Comprehensive Safeguards Agreements, http://www.iaea.org/Publications/Factsheets/English/nptstatus_overview.html

[4] Status of Additional Protocols, as of 20 December 2010, http://www.iaea.org/OurWork/SV/Safeguards/sg_protocol.html

[5] U.S. Government Accountability Office, "Strengthened Oversight Needed to Address Proliferation and Management Challenges in IAEA's Technical Cooperation Program," Report to the Chairman, Subcommittee on Oversight of Government Management, the Federal Workforce, and

The 2009 report examined TC assistance from 1997 through 2007. GAO found:

"Neither State nor IAEA seeks to systematically limit TC assistance to countries the United States has designated as state sponsors of terrorism—Cuba, Iran, Sudan, and Syria—even though under U.S. law these countries are subject to sanctions. Together, these four countries received more than $55 million in TC assistance from 1997 through 2007."

The report also found that "proliferation concerns associated with the TC program are difficult for the United States to fully identify, assess, and resolve for several reasons. While State has implemented an interagency process to review proposed TC projects for proliferation risks, the effectiveness of these reviews is limited because IAEA does not provide the United States with sufficient or timely information on TC proposals. Of the 1,565 TC proposals reviewed by DOE and the U.S. national laboratories for possible proliferation risks from 1998 through 2006, information for 1,519 proposals, or 97 percent, consisted of only project titles.

The GAO report further notes the IAEA's limitations and challenges in effectively managing the TC program including:

- Performance metrics had not been revised since 2002.
- Many states had failed to pay their full share of support.
- There is a lack of a policy to determine when states should be graduated from receiving assistance (several high-income countries have received TC assistance).
- There are limitations in IAEA efforts to track how to sustain project results and to find new TC program partners and donors.

The report had several recommendations. The two that had the most direct relevance to nuclear proliferation are:

- "Establish a formal mechanism to facilitate greater and more timely information sharing on project proposals between IAEA and the United States and other countries—including detailed information on the TC proposals themselves, as well as the results of IAEA's internal proliferation reviews of the proposals—so that proliferation and other concerns can be identified and addressed early in the project development cycle.
- Promote a regular and systematic process for obtaining, retaining, and updating information on prior TC project fellows to better track where and how the knowledge and expertise they have obtained is being applied."

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the District of Columbia, Committee on Homeland Security and Governmental Affairs, U.S. Senate, GAO-09-275, March 2009.

Although the GAO report did not recommend making TC assistance contingent on states' applying comprehensive safeguards agreements and additional protocols to those agreements, it did point out that several states had not done so and yet had received significant amounts of TC assistance. I believe that such a linkage should be established. We should use all the levers at our power to pressure states to apply safeguards. To me, it seems clear that the NPT intended peaceful nuclear energy assistance to require the application of adequate safeguards. Moreover, I recommend that states found in noncompliance of their safeguards commitments should not be eligible for receiving TC assistance until they come back into compliance. The United States should withhold a portion of its contribution to the TC Fund commensurate with the portion of assistance going toward states not in compliance with safeguards. Some would argue that making all TC assistance contingent on safeguards is too stringent and that humanitarian assistance should continue especially because the vast majority TC projects have no connection to weapons activities. The IAEA Board of Governors' 2007 resolution on Iran's TC assistance illustrates this point.

Iran has been found in violation of its safeguards commitments. But for decades, it has been one of the largest recipients of TC assistance. In 2006, the UN Security Council in its resolution 1737 called for the IAEA Secretariat to "evaluate all IAEA technical cooperation projects for Iran … and prepare a report including a list of projects which could, in the Secretariat's judgment, continue to be implemented." In February 2007, the IAEA Board of Governors concurred with the Secretariat's recommendations to not proceed with TC in one national project and ten regional projects and one interregional project except for specific activities and to not proceed at all with three national projects and four regional and three interregional projects. The Board did approve TC for eleven national and twenty regional and two interregional projects. One of the most notable suspended projects involved proposed TC to Iran's project to build a heavy water research reactor at Arak. Such a reactor could pose a significant proliferation danger.

I want to underscore that if the international community wants to be more serious about stopping proliferation, it needs to get more serious about using all available mechanisms within the IAEA to do so. This includes linking TC assistance to safeguards commitments.

I would like to conclude with one further example of an increasingly popular TC project: using nuclear energy to desalinate seawater. This concept is especially popular in the Middle East because of the region's freshwater shortages.[6] The IAEA sponsors workshops on nuclear desalination every two years at the International Center for Theoretical Physics (ICTP) in Trieste, Italy.[7] At these events, experts from the IAEA, ICTP, national governments, and academic institutes from around the world provide training in nuclear desalination technologies and processes. The seminars draw a wide

[6] I am thankful for research assistance and writing on this topic by Stephen Herzog, a visiting research associate at the Federation of American Scientists.

[7] IAEA, "Status of Nuclear Desalination in IAEA Member States," IAEA-TECDOC-1524, January 2007, Vienna, available from:
http://www-pub.iaea.org/mtcd/publications/pdf/te_1524_web.pdf, p.8.

audience of scientists and engineers from across the developed and developing world, with particular interest from the Middle East. IAEA seed money has been instrumental in stimulating the involvement of the academic community in technical cooperation on nuclear desalination.

The use of waste heat and electricity generated by nuclear reactors for seawater desalination has long been a popular idea. In particular, India, Japan, and Kazakhstan have emerged as nuclear desalination leaders that have demonstrated the effectiveness of the process.[8] Middle East and North African states like Egypt, Jordan, Kuwait, Saudi Arabia, Tunisia, the UAE, and Yemen—which have freshwater shortages—have expressed an interest in emulating these leaders.[9]

Still, there are subtle risks entailed in holding training seminars on nuclear desalination technology. These events provide a forum for nuclear physicists and engineers from around the world, including states of proliferation concern, to come together to exchange scientific knowledge and technical information. Additionally, by promoting nuclear desalination and other activities that fall under Article IV of the NPT, the IAEA and its academic partners may be incentivizing nuclear options over more viable, appropriate, and cost effective solutions to problems. In many countries, nuclear desalination may not be a suitable replacement for responsible resource management and water rights trading. Water security also underlies a considerable motivation for the nuclear development programs underway in Gulf states such as Kuwait, Saudi Arabia, the UAE, and Yemen.

Nevertheless, the use of reactors for seawater desalination purposes poses proliferation risks. This concern has led some nuclear engineers to propose the use of proliferation-resistant reactor technologies for desalination.[10] But no reactor technology is proliferation proof. Maintaining high standards for safety, security, and safeguards is essential.

[8] World Nuclear Association, "Nuclear Desalination," updated February 2011, London, available from: http://www.world-nuclear.org/info/inf71.html.

[9] In fact, scientists and engineers from these countries publish much of the contemporary research on nuclear desalination technology and its feasibility.

[10] See, for example, D. T. Ingersoll et al. "Nuclear Desalination Options for the International Reactor Innovative and Secure (IRIS) Design," 5th International Conference on Nuclear Option in Countries with Small and Medium Electricity Grids, Dubrovnik, Croatia, May 16-20, 2004; Yohji Uchiyama et al., "Seawater Desalination Using Reusable Type Small PWR," *International Journal of Nuclear Desalination*, Volume 1, Number 1, 2003.