October 2010

National Nuclear Security Administration

Office of Nonproliferation and International Security (NIS)

National Nuclear Security Administration
Defense Nuclear Nonproliferation

The Office of Nonproliferation and International Security applies program, technology and policy expertise to:

- **Safeguard and Secure** nuclear material to prevent its diversion, theft and sabotage.
- **Control** the spread of WMD-related material, equipment, technology and expertise.
- Negotiate, monitor and **verify** compliance with international arms control and nonproliferation treaties.
- Develop and implement DOE/NNSA arms control and nonproliferation **policy** to reduce the risk of weapons of mass destruction.

Advancing Nonproliferation through International Partnerships

The proliferation of weapons of mass destruction (WMD) is a global phenomenon, and as such threatens the security of all nations. The NNSA Office of Nonproliferation and International Security (NIS) focuses on preventing the proliferation of WMD materials, technology and expertise. At the heart of NIS' goals is the certainty that the success of any nonproliferation effort ultimately rests on international partnerships. Moreover, implicit in NIS programs is a belief that arresting the spread of WMD enhances national as well as international security. What threatens one, threatens all. This is a theme that President Obama addressed in 2009 in Prague when he stressed that, "We must strengthen our cooperation with one another, and with other nations and institutions around the world, to confront dangers that recognize no borders." In his 2009 Cairo speech he emphasized that, "Of course recognizing our common humanity is only the beginning. . . the needs of our people. . . will be met only if we act boldly in the years ahead; and if we understand that the challenges we face are shared, and our failure to meet them will hurt us all."

"We must strengthen our cooperation with one another, and with other nations and institutions around the world, to confront dangers that recognize no borders."

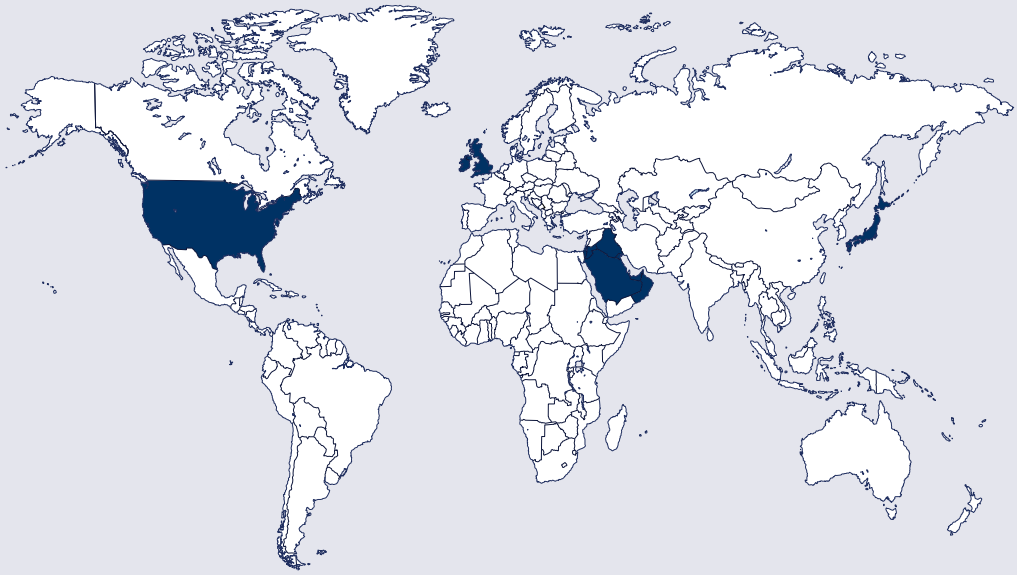
- President Obama

Throughout its history, NIS has sought to increase security both at home and abroad through the implementation of cooperative technical programs and nonproliferation activities in partnership with over 70 countries. Partners include foreign governments, key international organizations, and technical experts in every continent and at all levels of technological capacity. NIS brings to bear its unique capacity to apply program, technology and policy expertise with the scientific and technical capabilities of the U.S. National Laboratories to:

- **safeguard and secure** nuclear material to prevent its diversion, theft and sabotage;
- **control** the spread of WMD-related material, equipment, technology and expertise;
- negotiate, monitor and **verify** compliance with international arms control and nonproliferation treaties;
- develop and implement Department of Energy/National Nuclear Security Administration arms control and nonproliferation **policy** to reduce the risk of weapons of mass destruction.

In June 2010, NIS completed an office realignment (see related article page 2) to ensure that its organizational structure continues to efficiently address these core goals and to reflect program requirements more closely. NIS is now composed of the Office of Nuclear Safeguards and Security, the Office of Nuclear Controls, and the Office of Nuclear Verification.

In this edition of the NIS Highlights, each of these offices focuses on the crucial importance of robust international engagement and cooperation to the successful implementation of its programs, whether the particular context is bilateral, multilateral or regional. Working with Japan to test safeguards technologies, collaborating with the UK on technologies and procedures for nuclear weapons and facility monitoring, and cooperating with the Middle East region to conduct seismic monitoring to detect possible nuclear tests are just a few examples where NIS is using international partnerships to pursue nuclear nonproliferation to benefit people and interests of all nations. ■



NIS Realigns to Better Address National Security Threats

President Obama has characterized the possibility of terrorist acquisition of weapons of mass destruction (WMD) as the "most immediate and extreme threat to national security." To assist in addressing this threat the NNSA Office of Nonproliferation and International Security (NIS) works to prevent the proliferation of WMD by strengthening the nonproliferation, nuclear security and arms control regimes. In cooperation with international partners, NIS provides critical leadership in the development and implementation of nonproliferation programs and policies. To fulfill this role, NIS draws upon the technical expertise within the U.S. National Laboratories and international organizations. As global proliferation threat and threat-reduction priorities continue to evolve, it has become clear that a realignment of NIS programs and resources is essential to ensure the program's continued ability to address current and future nonproliferation requirements.

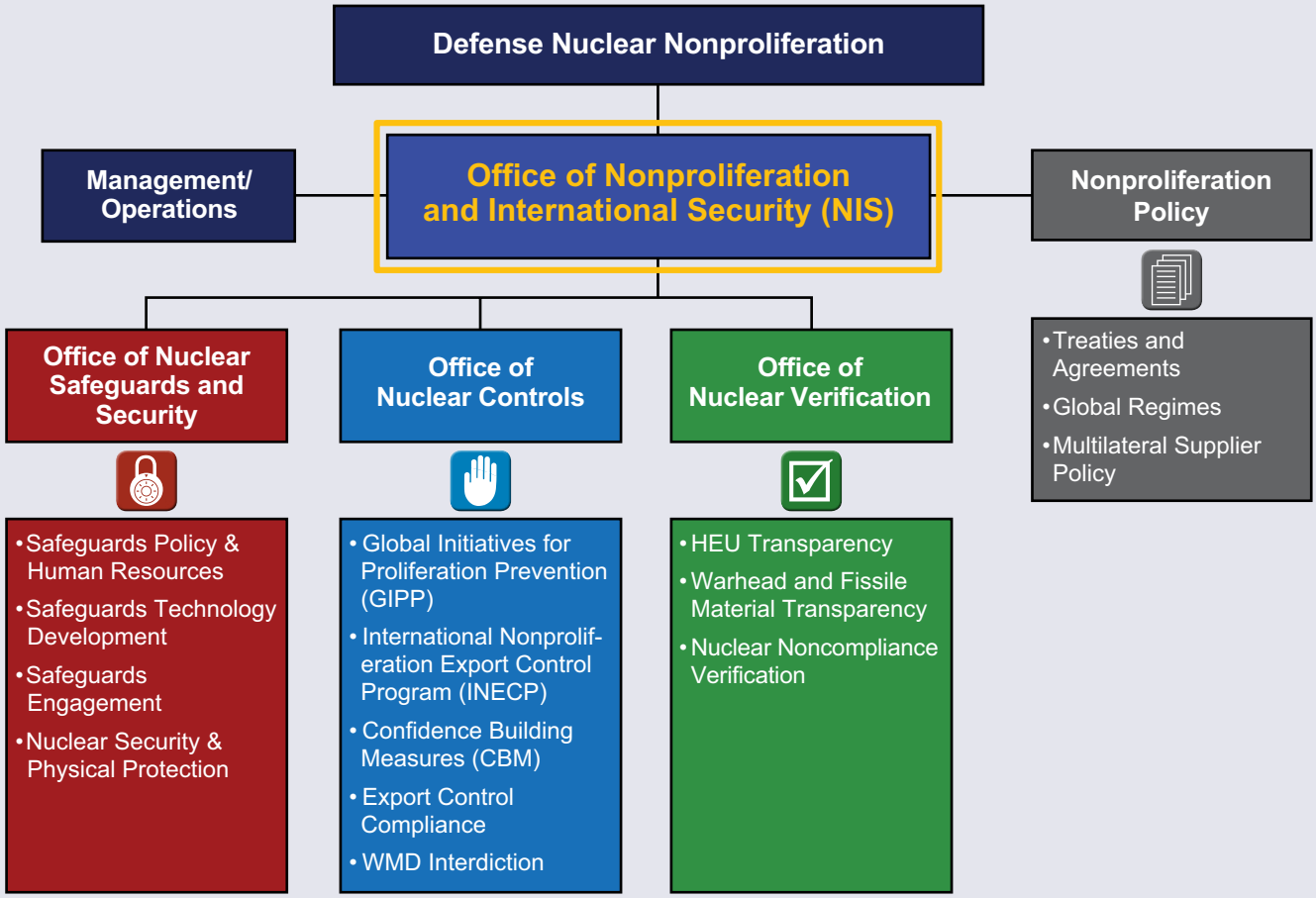
The realignment of NIS will increase efficiency and synergy among its component offices and programs while improving transparency and clarity of vision in implementing overall NIS goals. The NIS realignment focuses on four areas as described below.

The Office of Nuclear **Safeguards and Security** works under the umbrella of the Next Generation Safeguards Initiative (NGSI) and the Nuclear Security Program to safeguard and secure nuclear material to prevent its diversion, theft and sabotage.

The Office of Nuclear **Controls** builds a global capacity to control the spread of WMD-related material, equipment, technology and expertise through collaborative relationships with foreign governments.

The Office of Nuclear **Verification** negotiates, monitors and verifies compliance with international arms control and nonproliferation treaties.

The **Policy** function, resident within the NIS front office as well as its other three offices, focuses scientific and technology capabilities to develop and implement DOE/NNSA arms control and nonproliferation policy to reduce the risk of weapons of mass destruction. ■



The new NIS organizational structure.

U.S.-UK Nonproliferation and Arms Control Technology Program Marks 10 Years of Successful Collaboration

Nuclear Verification

October 2010 marks the 10-year anniversary of the highly successful U.S.-United Kingdom Cooperation (UKC) Program on Nonproliferation and Arms Control Technology, which is managed by the NNSA, Office of Nonproliferation and International Security's (NIS), Office of Nuclear Verification's Warhead and Fissile Material Transparency (WFMT) Program. The UKC Program applies policy, technology and program expertise to develop and evaluate targeted approaches for transparent reductions and monitoring of nuclear warheads, fissile material and associated facilities for potential arms control and nonproliferation initiatives. Participants in UKC Program activities include designated technical experts from U.S. Department of Energy (DOE) headquarters, the U.S. DOE National Laboratories, the United Kingdom's (UK) Ministry of Defence (MOD), the UK Atomic Weapons Establishment (AWE), and other MOD laboratories.

The UK's AWE, in coordination with the UK MOD, proposed the Program to the United States and in 2000 cooperation was established under the framework of the 1958 U.S.-UK Mutual Defense Agreement. Early work explored each country's arms control and nonproliferation programs and a cooperative path forward was developed to address areas of mutual benefit. Since its inception, the UKC Program has provided a unique and valuable venue for testing and evaluating the viability of potential technologies and concepts for nuclear weapons and facility monitoring and transparency.

The vision for the UKC Program is to develop consensus on technologies and technical procedures that could be utilized for potential future arms control or nonproliferation initiatives. This includes evaluating technologies and approaches that may be viable, those that likely are not, as well as challenges and approaches that need additional investigation. Specific technologies—or related underlying technologies and concepts—must be evaluated and developed as necessary in order to gain a consensus regarding the technology prior to considering its application in a potential international agreement or initiative. Working bilaterally with multiple laboratories helps to develop a broader base of technical advocates for potential future initiatives and enhances the working relationships between each country's technical experts. The UKC Program provides the opportunity for U.S. and UK technical experts to cooperatively develop procedures and technologies, as well as exchange ideas, in a manner that builds consensus while still protecting classified information.

The UKC Program activities are conducted through the use of a dedicated Exchange of Information by Visit and Report (EIVR), authorized under the 1958 U.S.-UK Agreement. Under the UKC Program's EIVR-58 on Nonproliferation and Arms Control Technology activities, technical experts conduct activities and share classified information related to verification and monitoring technologies for potential use in future nonproliferation or arms control agreements or as confidence building measures. Such activities might include the use of active or passive radiation measurements on warheads or components or an exercise or site visit to a nuclear facility by a monitoring team. Key to the successful use of these technologies or measures is the ability to protect classified and sensitive unclassified information, while still providing confidence in the validity of the collected data. The UKC Program is uniquely suited to address these challenges because of the close collaborative relationship that exists between the Governments of the United States and the United Kingdom and their national laboratory experts, in addition to the ability to exchange classified information under the 1958 U.S.-UK Mutual Defense Agreement. The UKC Program has assessed technologies, skills and procedures needed to accomplish these objectives, while specifically evaluating approaches for:

- managed access of inspectors into nuclear facilities,
- confirmation of declared nuclear warhead material attributes,
- continuity of knowledge for nuclear warheads and warhead components during storage and throughout the dismantlement process, and
- authentication of inspection and monitoring equipment.

Looking ahead, the UKC Program will further explore and address essential and difficult monitoring and verification challenges, working to integrate potential approaches for nonproliferation and arms control monitoring and transparency. Future activities that would support UKC Program goals and objectives include continued interactions in the following areas:

- cooperation on monitoring technologies and approaches,
- storage/remote monitoring collaborations,
- joint workshops,
- joint measurement campaigns/data analysis,
- warhead dismantlement transparency monitoring exercises or visits, and
- joint U.S.-U.K. technology development, application, authentication and implementation. ■

Experts conducting neutron measurements on a concealed object during a U.S.-UK measurement campaign.

Over 30 Years of U.S.-Japan Safeguards Cooperation

Nuclear Safeguards and Security

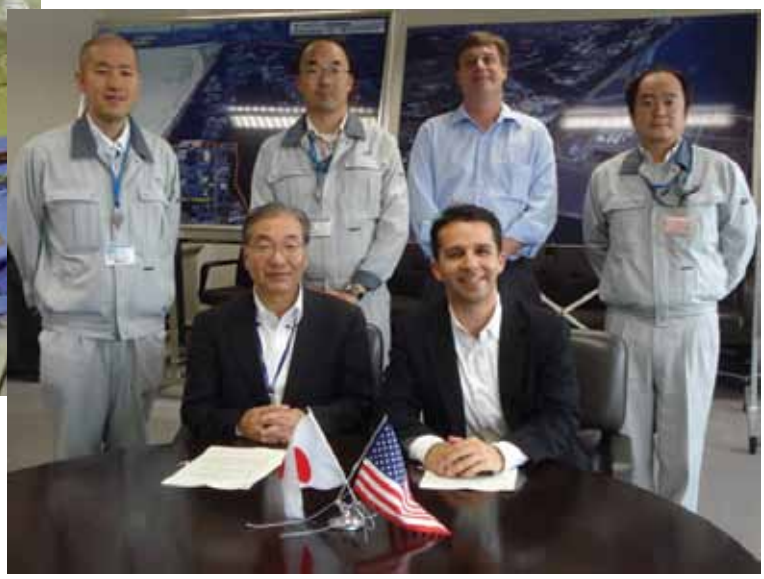
The U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA) has collaborated with Japan on nuclear safeguards for over thirty years. Japan has one of the world's most advanced civilian nuclear fuel cycles, and DOE/NNSA has partnered with the Japan Atomic Energy Agency (JAEA) and its predecessor organizations to find innovative safeguards solutions that better facilitate nuclear transparency and resolve complex verification issues at Japanese nuclear facilities. This partnership has yielded over one hundred projects, involving nearly every JAEA facility and many U.S. National Laboratories.

Specifically, the NNSA, Office of Nonproliferation and International Security (NIS), Office of Safeguards and Security is working with Japan and the U.S. National Laboratories through the Next Generation Safeguards Initiative (NGSI) to develop emerging safeguards technologies and test them at Japanese facilities. Japan continues to be a leader in promoting nonproliferation and regional cooperation on safeguards, security and safety. Partnering with Japan through NGSI to develop and test these new safeguards technologies and approaches enhances the implementation of international safeguards in Japan, builds safeguards expertise in both countries, and strengthens safeguards capabilities worldwide.

Current bilateral cooperation activities are focused on non-destructive assay measurement solutions for specific safeguards challenges such as glove box monitoring and fuel movements, preparation of reference materials, and data authentication for safeguards information transfer. The International Atomic Energy Agency (IAEA) uses a number of safeguards technologies developed through U.S.-Japan bilateral cooperation to reduce its inspection burden in Japan and in other countries. Technological concepts that have greatly improved the effectiveness and efficiency of IAEA safeguards, such as remote monitoring and secure data communications, were developed and tested through U.S.-Japan bilateral safeguards R&D cooperation.

To further expand U.S-Japan safeguards cooperation, DOE/NNSA and Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) have agreed to enter into a new, legally-binding agreement for cooperation by the end of 2010. The new agreement will provide a framework for technical cooperation in more Japanese nuclear facilities and in additional topical areas related to safeguards and nuclear security, such as safeguards technology development for the fast reactor fuel cycle, outreach to third countries, and training for domestic safeguards inspectors. Through this agreement, U.S.-Japan safeguards collaboration can build on the past thirty years of experience to address 21st Century challenges to the international safeguards system. ■

U.S. and Japanese experts evaluate and discuss the Ningyo-toge Waste Assay System (NWAS) project managed under NGSI.



DOE/NNSA and JAEA agree to begin new projects in 2010.

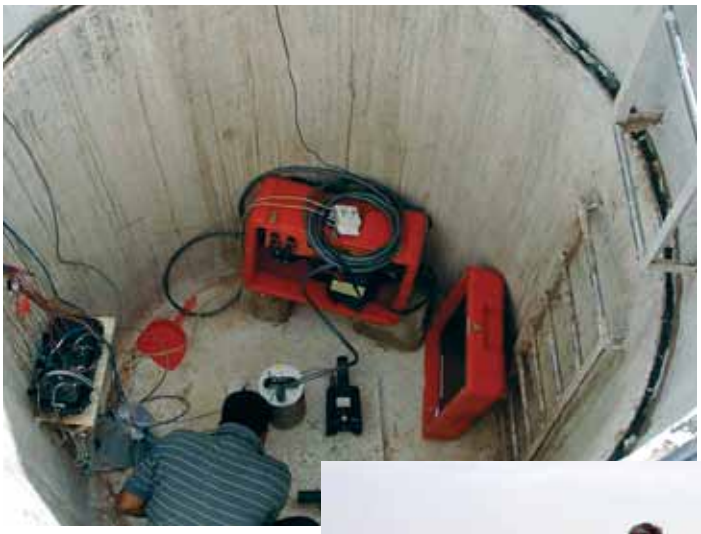
U.S.-CTBTO Workshop Enhances Treaty Ratification Capabilities in the Middle East

Nuclear Controls

In September 2010, the NNSA, Office of Nonproliferation and International Security's (NIS), Office of Nuclear Controls' Confidence Building Measures (CBM) program and the Comprehensive Test Ban Treaty Organization (CTBTO) partnered to host a technical capacity-building workshop in the Middle East. The four-day workshop was the first of its kind in the region and was held at the Department of Energy (DOE)/ NNSA's Cooperative Monitoring Center in Amman, Jordan.

In his April 5, 2009, Prague speech, President Obama committed to "immediately and aggressively pursue U.S. ratification of the Comprehensive Test Ban Treaty." With the Treaty's ratification a prominent priority for the Obama administration, attention is now refocused on U.S. and international monitoring and verification capabilities. Seismic monitoring is the foundation of the CTBTO verification regime's ability to detect, locate and characterize seismic events, including possible nuclear tests. While the President has not specified a timeline for achieving CTBT ratification, he believes that we must first lay the groundwork needed to thoroughly address the complex military, technical and diplomatic issues raised by the Treaty.

In line with the President's stated goal, the NNSA-CTBTO event enhanced technical engagement with seismology centers throughout the Middle East, in turn advancing CTBTO's monitoring capability and ratification prospects in the region.



Installation of a seismic recorder in the Middle East.

Seismic monitoring cooperation and earthquake hazard mitigation in the Middle East is an integral component of the CBM program. Developing modern seismic monitoring networks facilitates understanding the seismic attenuation patterns and characterization of regional geology, allowing partners to improve urban development and emergency response strategy. Cooperation and trust-building through these environmental security and human safety projects pave the way for addressing more sensitive security concerns, as the same networks and data analysis methods developed for seismic hazard mitigation are of significant value for CTBT monitoring.

Completed installation of a sealed seismic recorder in Kuwait.

CBM-led projects in the Middle East region also have had a positive effect on confidence-building with respect to Iran's nuclear activities, which present immediate proliferation concerns to the region and entire global community. Through improved techniques and increased data-sharing, seismic monitoring collaboration has served to reassure Persian Gulf countries of their national capacity to determine whether nuclear testing is taking place.

CBM plans for future seismic monitoring engagement in the Middle East and other regions include support for bilateral and multilateral workshops aimed at increased data-sharing and capacity-building across countries and regions of strategic importance to the United States. Such a capacity will aid the CTBTO in addressing verification concerns that have historically impeded CTBT ratification. In addition, CBM will continue to foster peer-to-peer cooperation and regional communication networks as a means of resolving technical challenges in the interpretation of seismic data that may arise in the context of a CTBT compliance issue. ■

For More Information
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