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Status of the U.S. Department of Energy (DOE) Government to Government Program in Russia

presented by
M. Teresa Olascoaga, Sandia National Laboratories
Program Coordinator for Cooperation between DOE and Gosatomnadzor of Russia in Nuclear Materials Protection, Control and Accounting

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Background

The U.S.-Russian Government-to-Government Program of Cooperation on Nuclear Material Protection, Control, and Accounting (MPC&A) evolved from the Nunn-Lugar Cooperative Threat Reduction Program. In 1995, the U.S. Department of Energy (DOE) assumed responsibility as the executive agent for implementation of the Government-to-Government MPC&A Program, followed soon thereafter by the programmatic responsibility for funding. The Russian Program initially emphasized limited exchanges, demonstrations, and upgrades at the low-enriched uranium (LEU) fuel fabrication facility at Elektrostal in 1994. The program has since expanded to include upgrades at nuclear facilities across Russia, development of the Russian Methodological Training Center (RMTC) in Obninsk; and cooperation with Gosatomnadzor, the Russian Federal Nuclear Radiation and Safety Authority.

This paper describes the overall program including program objectives, approach, and U.S.-Russian participation, with an emphasis on DOE-GAN cooperation.

Objectives and Approach of the Government to Government Program

The objectives and approach of the Government-to-Government Program cover four basic elements of cooperation:

- Improving facilities: U.S. and Russian specialists will implement substantial MPC&A upgrades at Russian facilities which contain weapons-usable nuclear materials.
- Training: U.S. and Russian specialists will create MPC&A training forums in order to fully integrate an MPC&A culture into the Russian nuclear complex.
- Deploying technology: U.S. and Russian specialists will collaborate on demonstrating and installing MPC&A technologies, while also assisting Russia in the further development of indigenous MPC&A design and production capabilities.
- Instituting national standards and systems: U.S. and Russian specialists will collaborate, where possible, on instituting and maintaining effective regulatory programs comparable with U.S. and international standards.

The Government-to-Government Program involves the participation of the U.S. National Laboratories, including Argonne, Brookhaven, Lawrence Livermore, Los Alamos, Oak Ridge, Pacific Northwest, and Sandia.

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Cooperation with MINATOM - Major Program Plans and Status

This section describes the plans and status of DOE's MPC&A upgrades at Minatom civilian nuclear facilities. This section also describes development of the RMTC.

DOE and Minatom have held five joint Technical Working Group meetings to agree on projects and schedules, set priorities, and discuss issues relating to implementation of the Agreement. Upgrades are underway at five major nuclear sites. Four new sites were added in January 1996. Cooperation is also underway to create a Russian MPC&A training center. The scope of work includes:

1. **Dimitrovgrad, Scientific Research Institute of Atomic Reactors (NIIAR):** U.S. and Russian MPC&A experts conducted site surveys of Dimitrovgrad in August 1995 and again in February 1996 focusing on facilities that work with highly enriched uranium (HEU) and plutonium (Pu). Also, MPC&A experts from the site participated in initial MPC&A training in October 1995. The Russian experts have completed a characterization of the site and drafted the initial work plan. The umbrella agreement for contracting has been signed to conduct specific tasks with the U.S. The initial work at these facilities will involve determining balance areas for handling nuclear material, developing an MC&A design, and defining a list of necessary equipment for procurement. Rapid enhancements will focus on the Central Storage Facility. A Vulnerability Assessment course will take place in June 1996. By the end of 1996, delivery and installation of physical protection upgrades will be underway at the four key facilities within NIIAR.

2. **Elektrostal, Production Association Machine Building Plant (POMZ):** U.S. and Russian MPC&A experts visited Elektrostal in August 1995 and February 1996 to discuss the progress of MPC&A upgrades to the low-enriched uranium (LEU) fuel fabrication line and expansion of cooperation to HEU production at the facility. For the initial stage of this work, Elektrostal has received computers, weighing equipment, seals and tamper indicating devices, access control equipment, a portal monitor, hand-held radiation detection equipment, and other MPC&A upgrades. DOE has also provided several training courses, including: Statistics and Measurements, Introduction to MC&A and Physical Protection, Tags and Seals, Non-Destructive Assay, and training for the equipment included in the upgrades. From the beginning of this project, the physical protection enhancements were focused on the HEU line. The initial plan for full upgrades to the HEU line has been completed. Additionally, installation of the second shipment of scales and completion of the physical protection upgrades to the three buildings that comprise the HEU line are underway. Upgrades to the LEU line and one other site will be completed in May 1996.

3. **Obninsk, Physics and Power Engineering Institute (FEI):** U.S. and Russian MPC&A experts visited the Institute of Physics and Power Engineering (IPPE) at Obninsk from August 9-11, 1995, to discuss adding facilities to ongoing MPC&A efforts. Government-to-Government and Laboratory-to-Laboratory upgrades ongoing at this site are being carried out by an integrated U.S. team. Government-to-Government work at IPPE focuses on physical protection, access control, a site-wide plan, and new facility upgrades.

The initial plan includes the creation of a nuclear island. This area will encompass 80-90% of the nuclear material at IPPE. By the end of 1996, installation of physical protection upgrades will be well underway for the perimeter of the island and several buildings containing special nuclear materials.

4. **Podolsk, Scientific Production Association Luch:** U.S. and Russian MPC&A experts conducted initial surveys of facilities that work with HEU from August 3-8, 1995 and a more detailed survey was conducted in February 1996. Early work involves MPC&A upgrades at four facilities. Equipment currently being procured will enhance radio communication, alarm communication, and increased security of materials in transport. Equipment delivery is scheduled for Spring/early Summer 1996. This follows the Vulnerability Assessment that was conducted by the Russians in April 1996.

5. **Chelyabinsk-65, Mayak Chemical Metallurgical Combine:** The joint working group prepared initial MPC&A upgrade plans for the civilian Pu reprocessing facility and its associated storage at Mayak, installing and demonstrating selected protection, portal, and access control technologies. After this successful demonstration, this sensitive facility was included in the program of cooperation. This project will be coordinated with British Nuclear Fuels Limited (BNFL), which is also involved with Mayak. U.S. and Russian MPC&A experts revisited the Mayak facility from August 7-10, 1995, and February 5-10, 1996. In February 1996, the umbrella agreement for contracting was signed and tasks were developed for enhanced MPC&A at five facilities. One near-term task is full physical protection upgrades at a storage facility with greater than 20 tons of Pu. The U.S. has agreed to deliver and install MC&A equipment and physical protection system upgrades by the end of 1996.

6. **Novosibirsk Chemical Concentrates Plant, Beloyarsk NIKIET, Beloyarsk Nuclear Power Plant (NPP), and Khlopin Radium Institute:** At the sixth meeting of the Gore-Chernomyrdin Commission in January 1996, Secretary of Energy Hazel O'Leary and Minister of Atomic Energy Viktor Mikhailov signed a "Joint Statement" adding these four new sites to the program. The initial site surveys for these facilities will occur in May 12-26, 1996.

In addition to site upgrades, Joint U.S.-Russian working groups agreed to establish the Russian Methodological Training Center (RMTC) at IPPE to train Russian MPC&A specialists. One of the primary goals of this project is to develop an indigenous and effective cadre of Russian training instructors in MPC&A systems, concepts, and technology. Training will include tutorials on the development of site and material characterizations, conceptual designs for upgrades at nuclear facilities, physical protection systems design, MPC&A and training equipment use, and special technical areas involved in the successful implementation and maintenance of MPC&A. Euratom is also involved in this program. The first course was conducted at the RMTC in October 1995 and included operators from five Russian facilities. More than five other courses are scheduled for 1996. Training for a number of instructors in several technical areas and the delivery of associated equipment will be well underway by the end of 1996.

Cooperation with Gosatomnadzor - Major Program Plans and Status

This section describes the program of cooperation between DOE and Gosatomnadzor, particularly the plans and status of this program.

Created in late 1991, Gosatomnadzor (GAN), the Federal Nuclear and Radiation Safety Authority of Russia, provides regulatory oversight of the Russian civilian nuclear complex. In June 1995, DOE and GAN signed an agreement for cooperation on nuclear MPC&A. To more clearly define the scope of work, DOE and GAN technical working groups met from October 18-20, 1995, agreeing to six projects. The DOE-GAN Joint Coordinating Committee, set up to implement oversight for the cooperation, met on October 27, 1995 and agreed upon a preliminary action plan for all six projects.

Project 1 Regulatory Development

The focus of this project is to develop nuclear regulatory documents for Russia with an initial emphasis on MC&A requirements. This project is being coordinated closely with the U.S. Nuclear Regulatory Commission. The first joint meeting was held in Washington, D.C. from March 4-9, 1996, to identify specific tasks. The near-term objective of the project is to exchange detailed written reports on the respective U.S. and Russian MC&A systems. The U.S. will review Russian draft regulations and will support the continued drafting of additional regulations.

Project 2 Development of the Russian Federal MC&A Information System

The objective of this project is to develop, in coordination withe Project 4, Russia's Federal MC&A Information System for tracking its nuclear material and transactions. The Institute of Atominform, in cooperation with GAN, leads this project in Russia. The first joint meeting was held February 5-9, 1996, in Washington, D.C. A two-week workshop to review the U.S. national system, particularly its evolution, was held in April 1996. As a result of this workshop, the joint team is beginning the process of defining system requirements for the Russian system.

Project 3 Provision of Equipment for Inspectors

This project consists of two sub-projects. The first sub-project is to assist GAN in defining requirements for MC&A equipment to determining quantity and composition of nuclear material; defining equipment specifications; and procuring, calibrating, and providing training in the use of this equipment. The second sub-project is to work with Russian experts at the Institute of Automatics to design and develop equipment prototypes. The first joint meeting took place February 26-March 1, 1996, in Moscow. The sides agreed to a list of equipment (portable high-resolution gamma spectrometers, sodium iodide gamma detectors, passive neutron coincidence counters, tags, and seals) that will be delivered July-August 1996. A training course for future GAN instructors in the use of this equipment is scheduled July 22-26, 1996, in the U.S.

Project 4 Development of the GAN Information System

The objective of this project is to develop GAN's MPC&A information system, which will communicate with a network of regional information systems, focusing on information related to

nuclear material status and inspection results. The first project meeting occurred April 15-19, 1996. A statement of work was drafted; and GAN provided a list of proposed tasks in response to the SOW for review by the US team. This project is coordinated closely with Project 2.

Project 5 Training

The focus of this project is to train GAN inspectors and facility operators, with a special emphasis on training future instructors. This project is closely coordinated with the development of the RMTC as part of the DOE-Minatom program of cooperation. GAN and Minatom personnel will be trained at the RMTC. The first project meeting occurred from February 26-March 1. This project will emphasize creation of a training system in the GAN regional bodies. A number of training courses are scheduled for mid to late-1996.

Project 6 Facility Upgrades

DOE and GAN technical working groups selected six sites for MPC&A upgrades. Initial site visits to all six sites were completed April 17, 1996. Memoranda have been signed agreeing to initial steps in implementing MPC&A upgrades at these sites.

1. **St. Petersburg Institute of Nuclear Physics (PNPI)**: The initial site survey was conducted February 8-9, 1996. Initial MPC&A upgrades are scheduled for 1996 and 1997. They include training in MPC&A concepts and vulnerability assessment; design and implementation of a material control and accounting system compatible with the national system, including control procedures, measurements, and computerized accounting; and a design review of MPC&A for a new reactor on site. The main reactor building will receive physical protection upgrades to include interior systems such as personnel access controls, portal monitors, and interior intrusion sensors, and design and implementation of upgraded exterior access controls, including the security perimeter and pedestrian and vehicular portal monitors.

2. **Karpov Institute of Physical Chemistry, Obninsk**: The initial site survey was conducted February 12, 1996. Initial cooperation to take place in 1996 and 1997 will include physical protection for the reactor and storage vault, including portal monitors and access controls, material accounting and control upgrades, including tags, seals, and computers, and MPC&A training, in conjunction with the Russian Methodological Training Center at IPPE, Obninsk.

3. **Moscow Institute of Physical Engineering (MIFI)**: The initial site survey was conducted February 13, 1996. The initial plan for cooperation to be implemented in 1996 and 1997 includes design and implementation of physical protection upgrades for the reactor building and fresh fuel storage vault, including communications equipment, personnel portals, and SNM detectors; and the design and implementation of material accounting and control upgrades, to include computers, tags, and seals.

4. **Joint Institute of Nuclear Research (JINR), Dubna**: The initial site survey was conducted February 14-15, 1996. Cooperative projects at Dubna scheduled for 1996 and 1997 include the design and implementation of physical protection upgrades, including

access control, intrusion sensors, vault hardening, personnel portals, video assessment, and upgrades to the central alarm station; and development of upgraded inventory-taking measurements and procedures.

5. **Norilsk Nickel Plant**: The initial site survey occurred April 8-12, 1996. The first step in cooperation at Norilsk will entail training for reactor operators and GAN inspectors in MPC&A concepts and technologies and the design, implementation, and evaluation of these systems.

6. **Tomsk Scientific Research Institute of Nuclear Physics**: The initial site survey occurred April 13-18, 1996. Initial cooperative projects include training on MPC&A concepts and vulnerability assessment methods, and design and implementation of improved physical protection for the reactor and storage area, improved nuclear material measurements and computerized material accounting, and material control methods and procedures.

Conclusion

DOE's Government-to-Government MPC&A Program of cooperation with Russia is closely coordinated with the Laboratory-to-Laboratory Program, which was initiated in 1994 as a separate but complementary MPC&A program. DOE and Russia have been successfully engaged in bilateral efforts to enhance nuclear MPC&A for weapons-useable nuclear material. The scope of these efforts has grown tremendously since 1994, when the first milestone in providing better protection for "at-risk" nuclear material at the Kurchatov Institute was met. In 1995, the program expanded to include 19 additional sites and to date in 1996, we have included another 18 sites. This work represents a preventative measure against the illicit use, diversion, or theft of nuclear material. DOE's MPC&A efforts have demonstrated tremendous success through joint cooperative efforts to secure our nuclear legacy.