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US/BELARUSIAN GOVERNMENT-TO-GOVERNMENT MATERIAL PROTECTION, CONTROL, AND ACCOUNTING COOPERATION AT THE SOSNY SCIENCE AND TECHNOLOGY CENTER

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ABSTRACT

A formal program of cooperation between the US Department of Energy and the Belarusian regulatory agency Promatomnazdor (PAN) began in 1994. A visit to the Belarusian Sosny Science and Technology Center (SSTC) by representatives from the United States, Sweden, Japan, and the International Atomic Energy Agency resulted in a multinational program of cooperation to enhance the existing material protection, control, and accounting systems in place at Sosny. Specific physical-protection-related recommendations included upgrades to the physical protection systems at Buildings 33 and 40 at Sosny and the security systems in the SSTC central alarm station.

US experts, in conjunction with the multinational team and Belarus representatives, have reviewed initial designs for physical protection upgrades at Sosny. Subsequently, the United States assumed an essential role for funding and technical oversight for enhancements at the SSTC, aspects of its emergency communication systems, and the upgrade of the SSTC site access control system. This paper addresses the status of physical protection enhancements at the Sosny site.

INTRODUCTION

The work described in this paper is part of a larger US government effort called the Government-to-Government Nuclear Material Protection, Control, and Accounting (MPC&A) Program. The MPC&A program is being implemented at those former Soviet Republic sites that possess nuclear material and that could benefit from enhanced MPC&A. In Belarus, initial cooperative efforts using Department of Energy (DOE) funding began in 1994. On June 23, 1995, a formal agreement between the US Department of Defense and the Belarusian Ministry of Defense was signed. As part of this formal program of cooperation, DOE and the Belarusian regulatory agency Promatomnazdor (PAN) were designated as the executive agents to administer the detailed activities of this agreement.

United States and Belarusian cooperation began in 1994 with a site visit to the Sosny Scientific and Technical Center (SSTC), located 16 km south of Minsk. The SSTC is the only site in Belarus at which MPC&A activities are underway. Material at Sosny is Category I according to International Atomic Energy Agency (IAEA) guidelines in INFCIRC 225, Rev 3.

Until 1990, Sosny was a major research and development center for nuclear power-related activities. In addition to operating several critical assemblies, the SSTC conducts research and testing for components of a mobile nuclear reactor designed to produce electrical power. After the Chernobyl accident and the dissolution of the Soviet Union, research activities at Sosny were significantly

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curtailed. However, the problem of fresh and irradiated nuclear fuel remaining at the SSTC had to be addressed.

Because the SSTC contains the only Belarus site with nuclear material of these types and quantities, it has become the "proving ground" for the strategies, systems, and protection, control, and status assurance of nuclear material. Three US DOE national laboratories—Sandia National Laboratories, Los Alamos National Laboratory, and Argonne National Laboratory—have joined representatives from DOE, Sweden, Japan, and Belarus in MPC&A activities at Sosny. This approach has helped to reduce redundancy and has allowed this international effort to capitalize on the strongest elements from each contributor.

PHYSICAL PROTECTION ENHANCEMENTS AT SOSNY

The implementation of the physical protection systems at the SSTC is a cooperative effort between Sosny and PAN MPC&A personnel and Swedish and US physical protection experts. Swedish physical protection experts, who drafted the initial MPC&A upgrade designs, have subsequently provided installation oversight and technical support with Swedish, Japanese, and US funding.

US personnel have provided facility physical protection equipment and nuclear material protection expertise. Specifically, Sandia's mission has been to apply its physical protection design and implementation expertise in these areas:

- Facility and/or site characterization
- Review and comment on the physical protection system design, analysis, implementation, and evaluation, including:
  - perimeter barriers and sensors
  - video assessment systems
  - interior sensor systems
  - information control and display systems
  - item protection and monitoring systems
  - communication and event response systems

This physical protection system work at the SSTC embodies the real-life nature of the government-to-government cooperative effort. Not only has this multinational effort enhanced confidence between US national laboratories, the MPC&A of this facility has been significantly improved.

System Implementation

Five main components comprised the physical protection system upgrades at Sosny: physical barriers, entry control systems, an alarm assessment system, interior and exterior sensors, and enhanced communications systems. before these systems could be installed at the SSTC, however, site preparation activities had to be completed. For instance, brush, discarded objects, debris, and existing fences had to be cleared and a 12-meter-wide clear zone established around Building 33.

Figure 1. Building 33 prior to upgrades

The clear zone will maximize the effectiveness of barrier and detection sensors and the cameras that encircle the facility. Infrared intrusion sensors, uniform exterior lighting, video surveillance, and security fencing have also been installed. Other external features included in the enhanced physical protection system and site preparation were window barriers and vehicle and personnel gates.

Physical Barriers

Security at Building 33 relies, in part, on physical barriers, such as the exterior security fence. It also involved restricting movement around and within the facility. All doors and windows into Building 33 have been sealed and/or alarmed. The front entry door is now accessible only through a turnstile and an electronically activated locking mechanism.

The Building 33 security fence also incorporates a new alarmed gate that is removable for vehicle access. The effect of these measures is to restrict pedestrian and motor traffic to designated gates only.

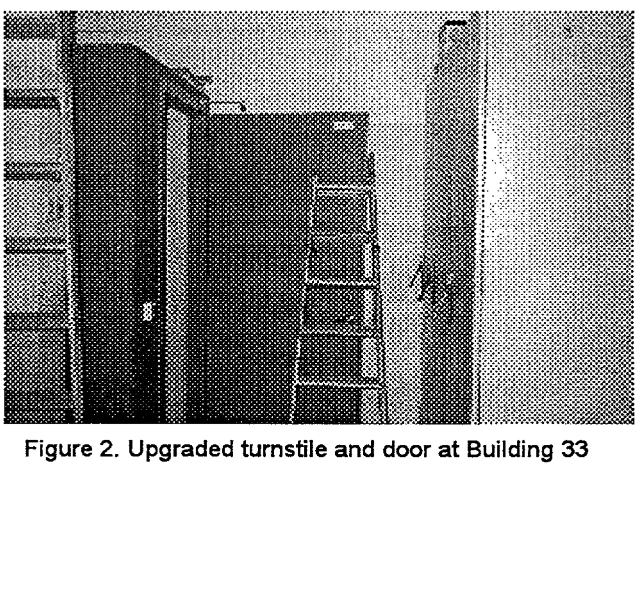

Figure 2. Upgraded turnstile and door at Building 33

Entry Control Systems

The exterior entrances to Buildings 33 and 40 are equipped with entry control systems that use secure card systems, personal identification numbers (PINs), and administrative controls. These three elements comprise physical entry and exit control at these Sosny buildings.

At Building 40 doors and windows and other potential entry points into the building have been alarmed. The experimental area within Building 40 has been converted into a nuclear material vault.

Special access located in Buildings 33 and 40 are equipped with motion sensors, video equipment and lights, access control keypads, access card readers, and intercoms for communication between personnel in the room and security personnel.

Alarm Assessment System

Video surveillance capability is now available to CAS personnel for important areas in Buildings 33 and 40, the exterior of the CAS, and vehicle entry portals at the SSTC. Additionally, the CAS has been relocated, hardened, and a "man-trap" entry installed.

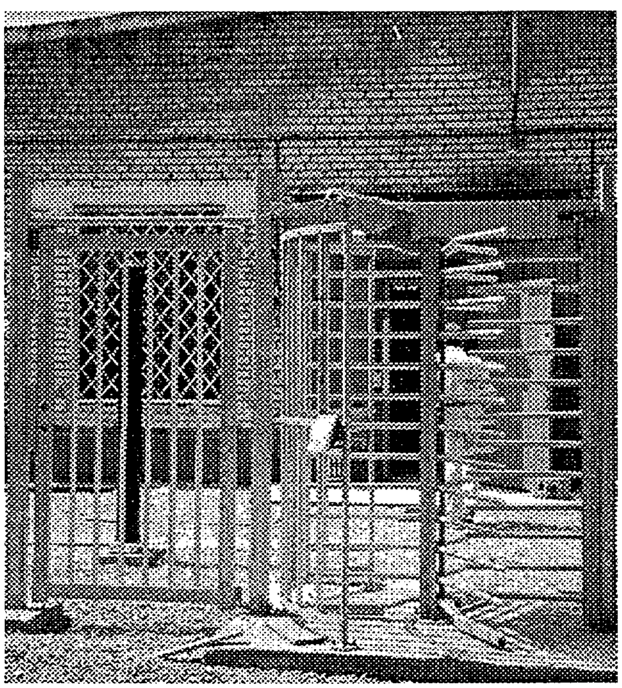

Figure 3. "Man-trap" door at Central Alarm Station

Interior and Exterior Sensors

Intrusion detectors have been installed at various locations to alert security personnel in the CAS should a secured door, window, or other area be compromised. Infrared sensor towers secure the clear zone surrounding Building 33. Interior sensors (e.g., balanced magnetic switches, seismic, infrared) monitor the nuclear material storage vaults and nearby access corridors within the building. These sensors enable security personnel to detect movement within the facility and to assess whether it is authorized movement. All sensors—both interior and exterior—are electronically connected to the CAS alarm communication and display system. These displays, which are in Russian, inform security personnel of the nature and status of an event. Handheld metal detectors are also available to security personnel for site and/or building entry and exit control.

Enhanced Communication Systems

In order to more effectively communicate with each other, with emergency response forces, and with both Belarus government offices, enhanced radio equipment has been provided to the SSTC security force.

PHYSICAL PROTECTION SYSTEM STATUS

Although most exterior physical protection activities at Sosny are nearly complete, some important elements are not yet finished. As an example, SSTC security forces require assistance to develop and apply new operational procedures to achieve optimum benefit from the new equipment.

Buildings 33 and 40 should be completed and certified by the end of 1996. Additionally, the upgraded equipment for the SSTC CAS is in place, but formal acceptance testing has not yet been scheduled.

Certification of all upgrades, personnel training, and final system-level testing and acceptance-related activities will likely extend to the end of 1996. Longer term cooperative efforts include several planned follow-up visits to ensure that equipment is operating properly and to jointly resolve any problems or issues that may arise.

CONCLUSION

Major enhancements in MPC&A at the Sosny site have been made as a result of the multinational cooperation among the United States, Sweden, Japan, and Belarus. The physical protection and MPC&A efforts at Sosny demonstrate that such cooperative efforts can be successful to implement viable systems that protect, control, and account for nuclear material.

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