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Upgrades to the Access Controls at the BN-350 Reactor in Aktau, Kazakstan

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Introduction

In December of 1993, the governments of the United States and Kazakstan entered into an agreement concerning the control, accounting and physical protection of nuclear material in order to promote the prevention of nuclear weapons proliferation. It was jointly determined that the BN-350 reactor in Aktau, Kazakstan had a significant quantity of nuclear material which warranted increased physical protection. After on-site surveys and cooperative analyses, the access control in the lobby of the reactor building was identified as one of the areas for strengthening. The new access control upgrades at the BN-350 will also require the development of new operational procedures and training for the security guard force. To aid in the accomplishment of this task, security supervisory personnel will be invited to Argonne National Laboratory-West at Idaho Falls, Idaho for a workshop. The workshop will assist the Kazakstani security supervisors in the development of the operational procedures necessary for their security force to interact effectively with the new equipment.

Background

The BN-350 is a fast breeder reactor located at Aktau, Kazakstan on the Mangyshlak Peninsula at the eastern shore of the Caspian Sea. The reactor began operation on November 29, 1972 and since that time has been providing electricity, heat and fresh water to the area. It is a loop type reactor, cooled with liquid sodium. The nominal thermal power of the reactor is 1000 MW, which can produce 350 MW of electrical power. In practice, only 150 MW of electric power is produced and the remainder of the thermal output is used to produce 120,000 tons of fresh desalinated water per day.

The twenty year calculated useful life of the reactor ended in May of 1993 however, careful examination of the facility has resulted in the conclusion that the reactor can safely continue operation and thus its operating license has been extended until 2003.

Being a breeder reactor, the BN-350 has produced a significant quantity of plutonium which requires a high level of physical protection.

Access Control Upgrade

At any nuclear facility there is the possibility of malevolent acts which can not be tolerated and must be guarded against. Therefore, it has been decided to improve the control of persons and hand carried items entering and leaving the reactor building. Previously, the entrance to the BN-350 reactor building was controlled by a single armed guard who visually checked the identification of persons entering the building. The goal of the improvements is to give a higher level of assurance that unauthorized persons and/or prohibited items do not come into the reactor building via the lobby entrance and that nuclear materials can not leave through the lobby without immediate detection.

The lobby to the building has been extensively modified to accept new electronic access control and monitoring equipment. All persons entering and leaving the reactor building will be required to pass through these devices. It should be noted that everyone who comes to the reactor building will have first had their identification checked at the main gate. Then, to enter the reactor building, a person must pass through a portal metal detector as well as place hand carried items on the conveyor belt of an x-ray machine. This inspection will help to ensure that prohibited articles such as guns or other dangerous weapons do not enter the building. After this inspection, the person must use a proximity card and enter their unique personal identification number into a keypad to unlock the full height turnstile for admittance. These controls will prevent unauthorized persons from gaining undetected entry to the building.

The reconfiguration of the lobby has also provided for two guard stations and masonry walls. These guard stations are located in opposite corners of the lobby to give an overview of people moving through the lobby during times of peak traffic. The new walls and locked full height turnstiles are a strong deterrent to unauthorized access.

A person exiting the building will utilize the card reader to unlock the turnstile. All passages through the card reader/turnstile are recorded on a computer and thus there is always a list of who is inside the building. A radiation detector will monitor the area around the turnstiles. It will be necessary for the exiting person to pass through the portal metal detector and place hand carried items on the conveyor belt of the x-ray machine. In this way there is assurance that the unauthorized removal of nuclear material does not occur.

Implementation

These new security controls will require that employees learn a new method of passing through the lobby for entry and exit of the building. To preserve good employee relations and promote a smooth transition to the new access procedures, the changes will be implemented in a series of progressive steps. Conceptual design pictures and diagrams have been posted in the hallway near the lobby for all employees to see. They will also see the construction modifications taking place as they come to work. Next, the x-ray machines and portal monitors will be set in-place

but not operated. In this way, the employees will become familiar with the required traffic pattern for passing through the lobby. Then, the turnstiles will be installed but not activated so that the employees become accustomed to passing through them in a free turning condition. After all the equipment has been in-place in a non-operational condition, it will be activated. Again, a progressive implementation will be followed. First, the x-ray machines and portal metal detectors will be activated. After, a week the turnstile/card reader interlock will be activated and the total system will be operational.

Operational Procedures

The guard forces at nuclear facilities operated by the Department of Energy in America have undergone an evolutionary period of technological security upgrades spanning many years. This effort was largely driven by the high cost of labor which made technical hardware solutions to security problems attractive. Consequently, U.S. security managers learned over time to modify their guard force operations to utilize emerging security technologies to best advantage.

In contrast to the U.S., the security of nuclear facilities in the Former Soviet Union, evolved in a time when guard labor in the form of military personnel was abundant and cheap. It was common to find large numbers of soldiers garrisoned on the premises of nuclear facilities. Prior to 1991, this was the case at the nuclear facilities in Kazakstan. However, when Kazakstan declared its independence from Russia, it lost the abundant supply of military guards. Now, Kazakstan finds itself in need of security technology to reinforce the protection of its nuclear facilities.

Under the Cooperative Threat Reduction Agreement, the U.S. will install modern security hardware at Kazakstani nuclear facilities. The supervisors of these facilities will soon find themselves responsible for the operation and maintenance of a variety of complex computerized security systems. They do not personally have the years of background experience with such systems which is needed to quickly integrate them into their present security operation. However, they will have experienced American security advisors to help prepare them for the transition to these new methods of operation.

Kazakstani security supervisors will be invited to a workshop on operational procedures development at the nuclear facility of the Argonne National Laboratory in Idaho. They will gain hands-on familiarization with the new types of security systems and a computerized Central Alarm Station. Equally important, they will develop and write, with the help of their American counterparts, a comprehensive set of operating procedures. With this information, the supervisors can return to the BN-350 and begin training their guards. In this way, they will be able to quickly integrate the new systems into their security operations.

Summary

The installation of modern security equipment in the lobby of the BN-350 combined with the development and implementation of new operational procedures for access control will give increased assurance that unauthorized persons and/or prohibited items do not enter the reactor building. There will also be an increased capability for the immediate detection of an unauthorized attempt to remove nuclear materials from the building.