

PECULIARITIES OF PHYSICAL PROTECTION ASSURANCE OF THE NUCLEAR MATERIALS AT NUCLEAR INSTALLATION DECOMMISSIONING STAGE



XA0200022

M.G.PINCHUK

Decommissioning of Nuclear Facilities (NNEGC ENERGOATOM), Ukraine.

On December 15, 2000 Unit 3 of Chernobyl NPP, which is the last one in Ukraine having RBMK-type reactor, was permanently shutdown before the end of its lifetime.

A number of projects related to establishing infrastructure for the plant decommissioning are being implemented in compliance with the Ukraine's commitments. These projects are funded by the European Bank for Reconstruction and Development, the US Department of Energy. A number of projects are implemented in the framework of TACIS Program, under On-site Assistance Program.

Decommissioning stage includes activities on fuel unloading from the cores of Unit 1 and Unit 3, fuel cooling in the ponds followed by the fuel transportation to the spent fuel dry storage facility (currently under construction) for its safe long-term storage. Special facilities are being created for liquid and solid radioactive waste treatment.

Besides, it is planned to implement a number of projects to convert Shelter Object in environmentally safe structure.

Physical protection work being an essential part of the nuclear material management is organized in line with the recommendations of the IAEA, and the Laws of Ukraine "On Nuclear Energy Utilization and Radiation Safety", "On Physical Protection of Nuclear Installations and Materials", "Regulations on Physical Protection of Nuclear Materials and Installations", other codes and standards.

While organizing physical protection on ChNPP decommissioning stage we have to deal with some specific features, namely:

- Significant amount of fuel assemblies, which are continuously transferred between various storage and operation facilities.
- Big amount of odd nuclear material at Shelter Object.
- Theft of new fuel fragments from the central hall of the Shelter Object in 1995 with the intention of their further sale. The thieves were detained and sentenced. The stolen material was withdrawn, that prevented its possible proliferation and illicit trafficking.
- Human factor - personnel whose professional and social future is indefinite shall be assumed a key factor in assurance of the proper level of safety culture of nuclear material management.

At present physical protection of ChNPP does not fully satisfy the needs of the decommissioning stage and Ukraine's commitments on non-admission of illicit trafficking.

The problems that need solution include: inadequate level of engineering protection of the areas intended to prevent nuclear material proliferation and lack of equipment for detection and documented record of unauthorized actions.

In view of the above we carry out work aimed at improvement of nuclear material physical protection, whose main objective is timely prevention, detection of and response to the attempts to use accounted nuclear material for illicit trafficking.

In addition to traditional measures, a centralized automated system to detect unauthorized intrusion, to register and suppress the penetration attempts and to organize controlled access to nuclear installation Chernobyl NPP and its internal areas is being established.

This system covers three levels of hierarchical physical protection system of all facilities of Chernobyl NPP. The distinguishing features of this system are: high level of stability and reliability, automatic self-diagnostic functions, detection of performance intrusion and restoration of the normal operability

This system has a number of local physical protection subsystems which are the key data base users and are capable to operate off-line in case of the short-time loss of connection with the top level. The access means will include full-height turnstiles and tripods. In the areas of particular importance video identification is envisaged. Passive remote inductive cards encoded on-site will be used as passes.

In addition, the issue of control, accountancy and physical protection to be exercised throughout the whole process of fuel discharge, cooling and transportation to KHOYAT -2 (interim storage facility), which will house nuclear material of the total activity more than 1.2 million Ci and about 4.00 tonnes Pu-239, is under review.

It is envisaged to create complex to support nuclear material management processes.

A provisional engineering solution provides for visual control and video recording, automated record of processes, casks' integrity control, communication means, blocking of the further operations when the precedent operations are inconsistent with QA program requirements, routing control and response forces notification.

It shall be emphasized that so far we do not know for sure the amount of nuclear and radioactive materials inside the Shelter Object which is its unique feature. In this view, physical protection and accounting of nuclear materials on the stage of nuclear fuel transportation shall meet the best standards and, in a way, guarantee non-proliferation.

Thus, decommissioning is a comprehensive process, which sometimes requires extraordinary approaches to solve comprehensive problems, including those relating to physical protection of nuclear materials and nuclear installations. It is rather difficult to highlight all the problems. Though, I hope that you will have a clearer understanding of our situation.