Main results of ten years co-operation with NIS in the field of Physical Protection of Nuclear Materials and Nuclear Facilities

P. Salewski, W. Gutschmidt

Gesellschaft für Anlagen-und Reaktorsicherheit (GRS) mbH
Cologne
Germany

Abstract: The Federal Republic of Germany (FRG), the Russian Federation (RF) and the New Independent States (NIS) have been working closely together since 1992 in the field of physical protection. The success of this co-operative work is based on mutually beneficial agreements between corresponding FRG and RF ministries. The main working points of these agreements were a) a mutual exchange of information and experience, and b) assistance in developing licensing and regulatory procedures and guidelines, and c) physical upgrades to Russian nuclear facilities. The first two points have been established by holding seminars, workshops and by on-site instruction. Upgrades of RF nuclear installations, financed by the FRG were performed at: the Bochvar Institute in Moscow, the Kurchatov Institute in Moscow and the Mayak reactor plant in Chelyabinsk.
This paper will outline the progress made to date and the GRS procedure for achieving successful co-operation with its RF and NIS counterparts. The major results of ten years co-operation will be shown.
The following document describes the experiences gained during the evaluation of security reports by GRS as an external expert organisation in contract with the Supervisory Authorities.

1. INTRODUCTION

Germany, the Russian Federation and the NIS have been working closely together since 1992 in the field of physical protection of nuclear materials and facilities. This co-operative work is based on unlimited agreements between the German Federal Minister for the Environment, Nature Conservation and Nuclear Safety (BMU), the Ministry for Atomic Energy of the Russian Federation (Minatom) and the Federal Regulatory Authorities of the Russian Federation for Nuclear Safety and Radiation Protection (Gosatomnadsor). Furthermore, this co-operative work is also based on an agreement between the Federal Foreign Office of Germany and Minatom. GRS as the central organisation for the field of physical protection in Germany was charged by BMU and the German Foreign Office to perform this co-operation.
The agreements specify the following main working points:

- Exchange of information and experience regarding the documents and rules as well as the technical resources and systems for physical protection;
- Assistance in the work on regulations for guaranteeing the physical protection of nuclear materials and facilities;

- Technical advice and assistance in working out the rules for licensing and regulatory procedures;
- Common analysis of the physical protection measures and common work on technical proposals for the purpose of upgrading physical protection;
- Upgrading and implementation of the systems and methods of physical protection through the application of German and Russian engineering know-how in specific cases.

A very important point in this co-operative work is that each party shall be obliged to regard the information made available as confidential information and make it inaccessible to third parties. For this reason, the resulting presentation shall only be of a general nature, and thus detailed information cannot be given.

2. EXCHANGE OF KNOWLEDGE AND INFORMATION

Important points were the carring out of seminars and workshops and on-site instruction and the organiszation of an internationale conference on physical protection. In 1992, GRS started with a first seminar on physical protection of nuclear facilites in Karlsruhe to exchange information on and experience with physical protection. For example, the following topics were addressed:

- National philosophies of safety and security,
- Rules and Regulations
- Precedures of the licensing and regulatory bodies,
- Physical Protection concepts of typical facilities.

Seminars of this kind with different programs were also held in 1993 and 1994. These seminars were of a general nature and were organized especially for licensing authorities.
A more specific exchange of information and experience was started with the workshops on physical protection, which were held twice a year for example in Germany, Russia, Ukraine and Kazakstan until 1998.

The participating experts discussed the following topics with regard to their national procedures:

- Meeting the requirements of the IAEA information circular INFCIRC/225,
- Fundamentals of physical protection,
- Licensing and control of shipments of radioactive substances,
- Licensing and control of nuclear facilities,
- Suitability of systems of physical protection
- Methods for identifying and improving the weak points of older facilities.

A further step in this co-operation is on-site instruction, with visits to nuclear facilities, to show and discuss the improvement of technical and personal physical protection concepts and measures. In this context experts of GRS, the competent authorities and the operators of Germany, Russia and NIS visited several nuclear facilities in Germany, Russia and the NIS. On-site-instructions are conducted until now.

From 1999 there was a change of the procedure and the aims in the workshops. In these workshops one main subject is the Design Basis Threat (DBT). The participants are working mostly in three working groups. Here a special workshop DBT has to be defined as a bsis for a physical protection concept of a hypothetical plant which was prepared before by GRS. The DBT, the physical protection concepts and the physical protection measures worked out by the groups were then compared and discussed in plenary sessions.

2.1. Main results of the exchange of knowledge and information

In the former time the physical protection of nuclear facilities in the eastern countries consisted in general of guards coming from the military troups of the ministry of interior and partly of elder technical physical protection measures.

There were only some older rules and guidelines, which had to be fullfilled without mentioning the reasons.
The seminars, workshops and on-site-instruction conducted by GRS are considered to have contributed to:

- The implementation of the subject physical protection into the newly installed atomic laws
- The formulation of an extensive frame of rules and guidelines
- The installation of an independend and well informed supervisory authority
- The improvement of the physical protection of nuclear facilities with respect to the international physical protection goals, against the outer threat as well as to the inner threat
- The development of a national DBT as a basis for a physical protection concept and for design of physcial protection measures
- The installation of modern technices provided sufficient funding is available.

Up to this time some essential physical protection functions e.g. detection, alarm verification and entrance control were fullfilled by personal measures. In the coming workshops it will be shown, that the installation of nuclear technics can be much more effective and cheeper. For this reason some German and Russian producers of modern physical protection technics are invited to participate.

Another main point for the coming workshops will be the analysis concerning the influence of inner threats in nuclear power plants. The workshops up to this date have shown that most of the participants beeing experts in the field of physical protection had problems to do such analyses. GRS therefor wants to contribute to an understanding that the people who are responsible for the safety of such plants have to work together with the people coming from the field of physical protection.

3. TECHNICAL UPGRADING OF RUSSIAN PLANTS

Another important point of this joint GRS Russian effort is the upgrading of Russian nuclear facilities by means of technical upgrading of the system of physical protection. The sponsors of these projects, BMU and AA have fixed that only category I plants should be considered concerning theft of nuclear materials.

The VNIINM facility in Moscow, which is referred to as the Bochvar Institute, was the first nuclear facility, which was selected for this work: The Bochvar Institue is about 50 years old.
The second plant which was selected is a research institute of the Kurchatov Institute Moscow named “Gas Plant”. This plant is also about 50 years old.

The third plant for a technical upgrading is a part of the big facility Mayak near Chelyabinsk. This plant has nearly the same age as the other two plants and is named “Reactor Plant”.
The first project in the “Reactor Plant” of Mayak concernes a facility called Ludmilla, a reactor to produce isotops. The second project in this “Reactor Plant” is also a reactor for isotops production, which is called Ruslan.

The fourth plant for a technical upgrading is a part of the big facility Tomsk 7 near Seversk. This plant is about 40 years old and is named also “Reactor plant”

In all mentioned plants some physical protection measures have been carried out. They are no longer sufficient to meet the national and international requirements.

3.1. Procedure

For each plant, a working group was put together from members of Minatom, partly Gosatomnadsor, the operator, the companies who were responsible to install the installations and the GRS. It was the special intention of GRS, that all important activities will be done in a joint manner to practice a real co-operation.
For the analysis of the facilities, all relevant subjects were extensively reviewed and disscussed in this working group. Upgrading measures were agreed upon by the operator and GRS.

For improving the physical protection of the plant, mainly the physical protection technology from the RF is employed. The experts from GRS have assured themselfes that this technology meets the requirements. This evaluation was based on visits to the manufactures of the technology employed, as well as functional tests at the plants.
The use of Russian technology has the following advantages:

- Russian technology is designed for the prevailing climatic conditions of the country;
- Equipment with Russian technology in the country is easy to maintain and repair;
- Russian technology is inexpensive.

After having carried out the planned measures, the plants and GRS jointly conducted inspections and operational tests. The cost of refitting technical components mostly was paid by Germany. Nevertheless, the financing of some installations, for example fission product monitors at the exits or new fences and detection systems at the perimeter, was done by the Russian partners.

The physical protection concept was based on the following boundery conditions:

- The main objective is, to prevent the theft of nuclear material of Category I
- The Russian rules and regulations for physical protection have to be regarded.
- Possible perpetrators are people who intrude into the plant from outside (Outer Threat) or fellow workers and foreign personell, including guards (Inner Threat).
- Since the national Design Basis Threat is not yet defined in Russia, it was necessary to define it for each plant in this co-operation.

- In establishing additional physical protection measures, the Russian concept of securing nuclear facilities by using military troops has to be taken into account. Furthermore, specifications, for example by the Ministry of the Interior, for the design and performance of the perimeter have to be taken into account.
- A very important limiting factor for the upgrading of nuclear facilities in Russia are the available funds. It is always necessary to find a compromize between the requirements of the plant, the special wishes of the operators and the possibilities to finance such a project.

3.2. Main results of the technical upgrading of Russian plants

Through the common work on the physical protection of special plants a common understanding for the following important points was reached among the participants of the working group:

- Significance of systems which are relevant from the safety and the physical protection point of view.
- Weak points of the facility
- Extensive physical protection concept
- Realization of a physcial protection concept with staggered measures – defense in depth
- Implementation of modern physcial protection technics frequently as a compensation fo personal measures.

The most important result was reached by improvement of the physical protection of the nuclear materials in the facility with the consequence that theft needs not to be feared anymore.

Therefore the following exemplary physical protection measures have been implemented:

- Modern technical detection systems around the facility, as well as automatic alarm verifikation systems and lighting
- Access control systems at the entrances in the perimeter and to the protected zones.
- Detectors of nuclear materials at the exists of the plant
- Security centers
- Physical barriers at the border of the protected zones
- Vehicle barriers at the exits of the perimeter
- Surveillance systems inside of the protected area
- Communication systems especially for the military troops.

These measures have allready been taken at the Bochvar Institue, the Kurchatov Institute “Gas Plan” and the reactor “Ludmilla” in Mayak. The other projects are scheduled for completion in 2003.

4. CONCLUSION

Our work has run in a very co-operative and friendly atmosphere. It should be emphasized that this ten years co-operation has led to a common view for the physcial protection of nuclear materials and facilities.
The seminars, workshops and on-site-instruction are considered to have contributed to the improvement of the national specifications, procedures and of additional measures.
Through the common upgrading of physical protection at the plants, the existing nuclear materials could be protected in a sufficient manner.

There is a common understanding between GRS and its counterparts that this co-operation should be continued in future.

REFERENCES

1. INTERNATIONAL ATOMIC ENERGY AGENCY; The Physical Protection of Nuclear Materials and Nuclear Facilities, INFCIRC 225/Rev.4(corrected), IAEA, Vienna (1999)
2. Atomic Energy Act: Gesetz über die friedliche Verwendung der Kernenergie und den Schutz gegen ihre Gefahren, 23. December 1959, last modification 03. Mai 2000
3. DBT: Auslegungsgrundlagen für ortsfeste Einrichtungen der Sicherungskategorie I gegen Störmaßnahmen oder sonstige Einwirkungen Dritter (SEWD), 09. September 1997, VS-Vertr.
4. Guideline for the Physical Protection of NPP: Richtlinie für den Schutz von Kernkraftwerken mit Leichtwasserreaktoren gegen Störmaßnahmen oder sonstige Einwirkungen Dritter, BMU RS I 3 – 13151-6/14, VS-NfD, 06. December 1995
5. Transport guideline: Richtlinie für den Schutz von radioaktiven Stoffen gegen Störmaßnahmen oder sonstige Einwirkungen Dritter bei der Beförderung, BMU RS I 3 – 13 151 – 2/4, 28. Mai 1991
6. Radiation Protection Ordinance: Verordnung über den Schutz vor Schäden durch ionisierende Strahlen, 30. June 1989, last modification 18. August 1997
7. Guard Service Guideline: Anforderungen an den Objeksicherungsdienst und an Objekt-sicherungsbeauftragte in kerntechnischen Anlagen der Sicherungskategorie I, BMI 08. April 1986
8. Outline Emergency Plan: Rahmenplan “Sicherung und Schutz kerntechnischer Einrichtungen bei verschärfter Gefahrenlage und konkreter Gefahr”, BMU RS I 3 – 13 143/20.2 VS-NfD

Titel:
0112501x.p65
Erstellt von:
PageMaker 6.5
Vorschau:
Diese EPS-Grafik wurde nicht gespeichert
mit einer enthaltenen Vorschau.
Kommentar:
Diese EPS-Grafik wird an einen
PostScript-Drucker gedruckt, aber nicht
an andere Druckertypen.