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MPC&A Training Needs of the NIS/Baltics States

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Abstract

This report serves to document contract deliverables considered to be of continuing interest associated with two workshops conducted as part of an initial assessment of Material Protection, Control, and Accounting (MPC&A) training needs of the Newly Independent and Baltic States (NIS/Baltics). These workshops were held in Kiev, Ukraine, ca. 2003-2004, with the assistance of personnel from the George Kuzmycz Training Center (GKTC) of the Kiev Institute of Nuclear Research (KINR). Because of the dominant role Ukraine plays in the region in terms of the nuclear industry, one workshop focused exclusively on Ukrainian training needs, with participants attending from twelve Ukrainian organizations (plus U.S. DOE/NNSA representatives). The second workshop included participation by a further ten countries from the NIS/Baltics region. In addition, the training needs data developed during the workshop were supplemented by the outcomes of surveys and studies conducted by the GKTC.

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MPC&A Training Needs of the NIS/Baltics States

David F. Beck, editor
Sandia National Laboratories

Introduction

The George Kuzmycz Training Center (GKTC) of the Kiev Institute of Nuclear Research (KINR) was established in 1998 to provide practical and theoretical training in nuclear material protection, control and accounting (MPC&A). Establishment of the Center followed an initial set of course offerings hosted in Ukraine by the U.S. Department of Energy (DOE) in 1996 and 1997. The need for a training center was based on recognition of the importance of providing trained MPC&A professionals under the requirements of a non-weapons State regime for the NIS/Baltics region (all former Soviet Union countries except Russia) in support of US nonproliferation interests. However, at a FY2003 program review meeting held by NA-243 in Washington, D.C., it was determined that an integrated project strategy should be developed to assure best application of resources in support of this need. Steps were set in motion to define an appropriate strategy. With intent to build on NA-25 experiences of setting up the training centers in Obninsk, Russia, Pacific Northwest National Laboratory (PNNL) was selected by NA-243 to lead efforts in defining the needs and planning a path forward. Based on past training activities at GKTC, Los Alamos National Laboratory (LANL) was tasked provide the necessary MC&A focus for the effort, while Sandia National Laboratories (SNL) would represent physical protection training interests.

Assessment Planning

Initial team meetings were held in May, June, and July 2003. Debbie Dickman of PNNL was designated as the team lead. Jozef Kuzminski of LANL and David Beck of SNL served as the other members of the US assessment team. It was decided fairly early that the socialization of the assessment activity and associated data gathering would be most effective if it were centered around a workshop setting. It was also determined that the

effort would only address training (or retraining) and not educational needs. Furthermore, to bound the scope of the initial assessment being planned, the focus would be on the MPC&A training needs of key personnel from nuclear sites, oversight organizations, and regulatory bodies. That is, commercial entities, border patrols, and facility guard or response forces do not appear in the tabulated training needs summaries, even though it is recognized that (1) these are important considerations to the overall problem, and (2), training has been provided to personnel from these groups in the past. In addition, the focus would be on nuclear material and not the more general concern of radiological materials protection.

Team planning efforts indicated that the most effective use of available resources would involve GKTC in gathering training information and in hosting a workshop. On behalf of the team, David Beck met with GKTC personnel in July 2003 to discuss possible support options. Based on the information so gathered, in August 2003 the team developed a draft statement of work (SOW) suitable for use in conducting a Ukrainian Training Needs Assessment Workshop and a NIS/Baltics Training Needs Assessment Workshop. The choice to host two workshops was driven primarily by (1) a desire to have a pilot workshop and (2) acknowledgement of the dominant role of Ukraine in the region in terms of the nuclear industry.

After considering NA-243 FY03 budget distributions among the labs represented on the US assessment team and ongoing contract activities, it was determined that SNL would negotiate contracts with the GKTC to support the data gathering and workshop activities. The draft SOW and supporting information was supplied to the SNL contracting organization for this purpose. A contract (SNL 188716) for the NIS/Baltics Training Needs Assessment Workshop was placed on 23 August 2003, and a second (SNL 188723) was placed on 24 September 2003 for the Ukrainian Training Needs Assessment Workshop.

Workshops

The primary purpose of this report is to document contract deliverables associated with the Ukrainian and NIS/Baltics Training Needs Assessment workshops considered to be of

continuing interest to regional needs assessment activities. These deliverables are outlined below and are provided as appendices in this report as noted. Of course it should be recognized that the material was translated from the original Ukrainian or Russian as provided by the GKTC. No effort was made to review and correct the translations, spelling, grammar, or punctuation; numerical data, however, have been validated—and corrected where necessary—against the original. The reader should also note that multiple translators were involved in this effort, which makes for some transcription (e.g., names) and terminological differences in the text. Miscellaneous editorial comments have been added in square brackets.

As a starting point, the initial effort on the part of the GKTC was to develop a hypothesis, if you will, of the basic MPC&A job categories and associated task descriptions, and a supporting set of training topics, that would describe the key personnel from nuclear sites, oversight organizations, and regulatory bodies and their training needs. The results were used to help design questionnaires and guide later discussions. This material is provided in Appendix A as follows:

A.1. Physical Protection Basic Job Descriptions

A.2. Nuclear Materials Control and Accounting Basic Job Descriptions

A.3. Initial Set of Physical Protection Training Topics

A.4. Initial Set of Nuclear Materials Control and Accounting Training Topics

Further development of these ideas took place as a result of interaction with organizations interested in participating in the workshops, and as a result of guidance received from the US assessment team (particularly from PNNL based on prior Obninsk experiences). The documentation at this point is best presented by workshop. Those materials associated with the Ukrainian Training Needs Assessment Workshop that was conducted on 4-5 December 2003 are provided in Appendix B. Those materials associated with the NIS/Baltics Training Needs Assessment Workshop that was conducted on 28-30 January 2004 are provided in Appendix C. However, both of these appendices have a common outline as follows:

1. Initial or Draft Training Needs Assessment Questionnaire
2. Facility Visit Report—GKTC personnel visited select facilities in an effort to help ensure appropriate data was collected and to prepare potential participants for the workshop.
3. Integrated Report—GKTC personnel analyzed and integrated the data collected through the questionnaires and supporting visits. A copy of this report was provided to all participants at the start of the associated workshop.
4. Workshop Agenda and Participants List
5. Workshop Presentations—Some workshop participants gave a presentation concerning their particular concerns or MPC&A training needs. Where available, presentation summaries are provided. (Interested readers may want to supplement this material with that found on web sites such as http://www.nti.org.)
6. Workshop Protocol—The common understanding coming out of each workshop was documented in a protocol.

For information on the Ukrainian needs, the interested reader should consult Appendix B. For information on Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Tajikistan, and Uzbekistan, consult Appendix C. The NIS/Baltics countries of Estonia, Moldova, and Turkmenistan were not represented in the workshops due to a combination of the lack of identifiable nuclear material or nuclear facilities of concern and a lack of desire on their side to participate (at least on the part of those officials who were contacted by the GKTC).

For those readers only interested in high-level summaries, the survey results can be found as follows: Ukraine MC&A needs, page B.3-9; Ukraine PP needs, page B.3-16; NIS/Baltics MC&A needs, page C.3-13; NIS/Baltics PP needs, page C.3-26. The workshop summaries (protocols) can be found for the Ukrainian workshop at page B.6-1, and for the NIS/Batics workshop on page C.6-1.

Note that the data necessarily reflect the understanding of those participating in the pre-workshop surveys and in the workshops themselves; any facility construction or

decommissioning activities, or significant changes in the MPC&A regulatory environment since the dates of the workshops, may impact any conclusions that can be drawn. It should also be recognized that because one workshop was focused solely on Ukraine while the second involved participants from ten other NIS/Batlics countries, significantly more data is available in this report on the training needs of Ukraine relative to these other countries.

Related Studies

In addition to the material develop during or in direct support of the training needs assessment workshops, several other, related study contracts have recently been executed with GKTC that are of interest. In fact, the results of these studies could be considered to represent the closest thing to an assessment of the MPC&A training needs of the region (although the focus is heavily on physical security) by the staff of the GKTC, however incomplete. The titles associated with these contracts were:

- Development of MPC&A Training Course List and Training Course Summary for Ukraine and NIS/Baltics Countries (aka *Course List*)
- Review GKTC student data and development of a database of Ukrainian MPC&A experts for the George Kuzmycz Training Center (aka *Personnel Data*)
- Survey of Companies Licensed by Ukraine to Perform Work Related to the Physical Protection of Nuclear Facilities (aka *Security Companies*)

The primary goal of the *Course List* contract was to build on the results of the training needs assessment workshops by developing a list of training courses or training course topical areas for the Ukraine and other NIS/Baltics countries. Under this contract the GKTC was assigned two primary tasks: (1) for the Ukrainian physical protection system personnel, develop a list of recommended training courses, with summaries, based on reviews and recommendations of the regulating and control authorities and select nuclear facilities; and (2), for the NIS/Baltics physical protection system personnel, identify the training courses that represent the joint interests of the MPC&A experts in the NIS/Baltics countries based on follow-up discussions with workshop participants.

Secondary tasks included identification of prospective physical protection course students on a course-by-course basis and on developing a MC&A course list. The material developed under this contract is provided as Appendix D. Note that as the final contract report was signed 25 October 2004, the material in Appendix D can be considered to reflect the understanding of training needs as of that date.

The primary goal of the *Personnel Data* contract was to support any course development or conduct activities resulting from the workshops by assessing previous, 1996-2003 KINR/GKTC courses in terms of student feedback and material availability. Under this contract the GKTC was assigned the primary task of conducting a survey of personnel previously trained at GKTC. A secondary task was to place the information gathered into a training database (which means that detailed, tailored reports should be available). The survey outcome, at a minimum, provides the interested reader with a summary of the numbers and types of courses conducted, along with the organizations and numbers of personnel attending. However, the data can also be used to assess turnover rates as part of the training needs assessment. It is also useful for information regarding: (1) course and venue improvements; (2) a list of desired physical protection courses from the participant's (worker's) perspective; and (3), a list of specialists that potentially can serve as instructors in future course offerings. The material developed under this contract is provided as Appendix E.

The primary goal of the *Security Companies* contract was to support upgrade activities in the Ukraine. GKTC was tasked to identify licensees able to perform work related to the physical protection of Ukrainian nuclear facilities in the areas of design, fabrication, supply, installation, test, maintenance, operation, and upgrades. However, since the results of this study included data on the number of personnel (e.g., engineers and technicians) by activity and work scope, it may be useful to supplement[1] the Ukrainian

[1] Numbers for facility guards or response forces can potentially be developed from facility visits, surveys, or assessments conducted by DOE or NNSA to meet other programmatic needs. "Second-line-of-defense" and "Radiological Threat Reduction" programs may also be a source of information for extending the scope of this study.

workshop results for the “commercial entities” category otherwise excluded. It may also serve as a lead in developing instructors for particular specialty areas. The material developed under this contract is provided as Appendix F.

Summary

Two MPC&A training needs assessment workshops were conducted in Kiev, Ukraine, ca. 2003-2004. The material produced in support of and during these workshops, along with related studies conducted by the staff of the GKTC, provide a unique and perhaps unparalleled view of MPC&A training needs of the NIS/Baltics countries. This material has been used in a USDOE/NNSA directed assessment that developed a set of recommendations in developing a path forward and future training activities in the region (documented under separate cover). This material may also be of use in similar assessment activities by organizations such as the International Atomic Energy Agency.

Appendix A.1. Physical Protection Basic Job Descriptions

No.	Activity	Work description
		Regulatory authority level
1	Physical protection state policy forming and implementation	- Participation in development of laws associated with physical protection. - Development of regulations, rules and standards. - Coordination of activities of central executive power authorities involved in government regulation or in implementation of physical protection of nuclear materials and nuclear facilities (PP of NM and NF). - Participation in implementation of international agreements and measures on prevention of unauthorized circulation of nuclear materials. - Implementation of functions of the Central Body and communication point for IAEA. - State expert analysis of the projects. - Methodical assistance to operators in implementation of PP of NM at the sites/facilities and in specialist training. *Notice: Personnel performing PP activities need to be systemic trained in formation and realization of a state policy.*
2	Licensing	- Determination of activities in the field of physical protection of nuclear materials subject to licensing. - Development of licensing procedure for the types of activities in the field of physical protection of nuclear materials. - Licensing for the types of activities associated with provision of Physical protection of nuclear sites/facilities and nuclear materials.
3	Inspection	- State inspection of physical protection systems. - Inspections planning and implementation. - Organization and implementation of comprehensive checks/inspections of physical protection systems. - Efficiency assessment of operator's physical protection system including license requirements compliance. - Preparation of reports on inspections results. - Recommendations and instructions for the operator based on inspection results. - Follow-up measures to control implementation of instructions.

Control authority level		
1	Participation and development of legislative basis and legal regulations in the field of physical protection	- Participation in development of legislation and legal regulations. - Development and approval of departmental legal regulations and their enforcement. - Determination of physical protection levels. - Organization of cooperation of executive bodies. - Development, support and implementation of national programs. - Shaping of main directions of cooperation with international organizations. - Development of departmental information schedules on physical protection containing government information and other limited official use information.
2	Scientific and methodical support of departmental facilities/sites	- Development and implementation of preventive measures to ensure safe operation of sites/facilities. - Security organization on sites/facilities. - Organization and support of functioning of professional training, re-training and advanced training system. - Methodical guidance of physical protection departments activities at departmental sites/facilities. - Drills and exercises organization and implementation.
3	Control of physical protection status at departmental sites/facilities	- Control over activities of physical protection departments and security detachments, inspection of physical protection systems status. - Preparation of programs and plans for regular testing and inspection of technical means of protection.
Operator level		
1	Design of the physical protection system	- Development of requirements for PP system and access and clearance procedures. - Development of requirements specification for PP system design. - Control and support of PP design. - Analysis and modeling of physical protection system design. - Design approval.
2	Commissioning and operation of PP system	- Providing for proper assembly, installation and adjustment of engineered protection means. - Preoperational testing. - Commissioning. Operation, technical support and maintenance.
3	Physical protection	- Interaction with regulatory and controlling

	management.	government agencies, local authorities and law enforcement agencies. - Providing for site compliance with legal requirements, regulations and standards for physical protection. - Providing for cooperation of the operator with guard force. - Development of contingency plans including plans of interaction with involved organizations. - Providing proper clearance and access control procedures. - Physical protection system vulnerability assessment measures and implementation of correctional and compensative measures. - Organization of PP personnel training.

Appendix A.2. Nuclear Materials Control and Accounting Basic Job Descriptions

No	Activity	Work description
Regulatory authority level		
1	Formation and implementation of government policy in the field of nuclear material control and accounting	- Participation in law-making in the field of NM safety. - Development of regulations, rules and standards. - Coordination of activities of central executive power authorities, involved in government regulation or implementation of activities in the sphere of Nuclear Material Control and Accounting (MC&A). - Participation in implementation of international agreements and measures on prevention of unauthorized circulation of nuclear materials. - Development and management of a national MC&A system. - Methodical assistance to operators in implementation of MC&A on sites/facilities and in specialist training. *Notice: Personnel performing MC&A activities need to be systemic trained in formation and realization of a state policy.*
2	Licensing	- Determination of activities in the field of nuclear materials control and accounting subject to licensing. - Development of licensing procedure for the types of activities on nuclear materials control and accounting. - Licensing for the types of activities, associated with MC&A.
3	Inspections	- Inspections planning and implementation. - Inspection of operator's compliance with requirements of the national MC&A system. - Efficiency and performance assessment for operator's MC&A system. - Independent inspections of nuclear material inventory including random measuring. - Independent check of operator's measurements quality. - Checks of operator's compliance with licensing requirements. - Recommendations and instructions for the operator. - Follow-up to control instructions implementation.
4	Interaction with IAEA	- Interaction with IAEA on issues of the Safeguards Agreement. - Preparation of reports in the format set forth by code 10 of Additional provisions to the Safeguards Agreement. - Provision for inspection activities of IAEA. - Analysis and generalization of information on inspection results provided to IAEA. - Notification of organizations and departments on IAEA inspection results. - Implementation of measures to resolve problems found by IAEA.

Controlling authority level		
1	Participation in development and development of legislation and legal regulations in the field of MC&A.	- Enforcement of provisions of international agreements of the country, in relation to the Safeguards. - Participation in development of legislation and legal regulations. - Providing for implementation of requirements for nuclear material accounting and control, including IAEA recommendations at departmental facilities. - Development of departmental provisions, instructions and orders. - Scientific and methodical support of facilities in explaining of provisions of the regulations and rules of regulatory authority, provisions of instructions and orders of the controlling authority.
2	Inspection of compliance with government and departmental requirements at nuclear facility/site	- Organization and implementation of inspections at sites/facilities to check for compliance with requirements of the legislation, regulations, rules, provisions, instructions and orders. - Analysis pf presence on departmental facilities of financial and technical means for nuclear material control and accounting. - Analysis of personnel adequacy in the sphere of nuclear material control and accounting activities, development and implementation of personnel training to train MC&A specialists. - Independent NM measuring and assessment of uncertainty of NM measuring performed by the operator. - Quality of work assessment.
3	Interaction with IAEA	- Support of IAEA in inspection activities at departmental sites/facilities. - Scientific and methodical support of facilities/sites in questions associated with cooperation with IAEA
Operator level		
1	Development of procedures	- Development and implementation of instructions and provisions on organization of operator's system of nuclear material control and accounting. - Development of NM accounting documentation and instructions for NM control depending on NM storage form.
2	Nuclear material control and accounting at the site/facility	- Nuclear material control and accounting activities pursuant to the approved procedures: setting up materials balance zones, identification, inventory-taking, material balance accounting, monitoring and safety measures, NM shipping/receiving issues. - Support of the database and of information system on nuclear material control and accounting.

		- Ensuring of high quality of containment/surveillance to assure "continuity of knowledge" of nuclear material. - Implementation of new methods of the nuclear material control and accounting and statistics processing of measurements results. - Measurement of nuclear materials by the modern equipment and preparation of nuclear material standards for use in the measurement. Processing of measurement results. - Development and application of measurement control systems. - Reports and accounts preparation. - Interaction with IAEA inspectors.
3	Management	- Interaction with regulatory and controlling government agencies. - Providing for development and efficient operation of nuclear material control and accounting system at the site/facility, including the control over NM measurements. - Organization of implementation of instructions of the regulatory and the controlling authority. - Organization of cooperation with IAEA inspectors. - Organization of MC&A personnel training. - Quality of work assessment.

Appendix A.3. Initial Set of Physical Protection Training Topics

No.	Training course name	Course description	Attendees
1	Physical protection basics	- Introduction to PP - Legislative basis of PP - PP regulations and standards - The notion of physical protection system (PPS) - Functions of PPS - Engineered and technical means of protection - Functions of guard force and response force - PPS Vulnerability - Development of correctional measures	Personnel beginning to work in the field of nuclear materials physical protection (NM PP)
2	Methodology of evaluation and determination of design threat (DT)	- Role of design threat (DT) for physical protection - Risk evaluation - Sources of information for DT - Regulatory requirements for DT - DT development process - Main principles of DT development - Review of DT	Management of PP departments in regulatory and controlling authorities and at facilities/sites
3	Introduction to design of physical protection system	- Regulatory requirements in the field of PP of nuclear material and nuclear facilities - Facility characterization - Threat definition - Target determination - Functions of PPS - Engineered and technical means of PPS - Functions of guard force and response	Personnel beginning to work in the field of nuclear materials physical protection (NM PP); instructors

		force - Approach to project analysis and evaluation	
4	Design of physical protection systems	- Facility characterization - Threat determination - Targets identification - Requirements for PPS - Main principles of design process and design evaluation - System engineering process - Performance requirements support - Design analysis and evaluation of PPS design.	Designers, PP engineers, regulatory authority inspectors.
5	Basics of physical protection systems modeling	- Introduction to modeling - Computer models - Threat models - Protection system models	Designers, PP engineers, regulatory authority inspectors; analysts.
6	Introduction to PPS vulnerability assessment	- Study of facility characteristics - Design threat - Targets identification - Protection and security means - Evaluation of adversary skills (capabilities) taking into account facility PPS status - Analysis of system sensitivity to changes in different factors - Quantitative evaluation of efficiency - Actual system vulnerability - Development of correctional measures.	Regulatory authority inspectors; PP managers; PP engineers; analysts; instructors
7	Identification of vital areas	- Facility characterization - Design threat - Process of vital areas identification	Inspectors; programmers; PP analysts; nuclear and radiation safety specialists;

		- Stages of analysis of vital areas - Mathematical means of vital areas analysis - PPS vulnerability analysis - Use of SAPHAIRE software	Instructors
8	ADVANTOR physical protection equipment use	- Equipment description - Software - Working with the software - Technical characteristics of detection, monitoring and assessment means - Review of most typical malfunctions and troubleshooting	PP operators and technicians; Instructors
8	Introduction to performance testing of physical protection systems	- Development of tests plans - Testing - Analysis of test results - Application of the results for PPS efficiency increase	PP departments engineers, engineered and technical security specialists; Regulatory authority inspectors
9	Crisis management	- Interaction plans in crisis situations - Crisis management process - Actions and role of each leadership member in crisis management - Measures after the elimination of a crisis	Facility/site management; PP departments managers of regulatory and controlling authorities; Employees of involved agencies

Appendix A.4. Initial Set of Nuclear Materials Control and Accounting Training Topics

No.	Training course name	Course description	Attendees
1	Introduction to nuclear materials control and accounting	- IAEA Safeguards system - State system of nuclear materials control and accounting - Organization of nuclear materials control and accounting system at facilities/sites - Reports and documentation - Automation of nuclear materials control and accounting - Methods of quantitative control of nuclear materials	Personnel beginning to work in the field of control and accounting
2	Nuclear materials control and accounting	- Approach to implementation of IAEA Safeguards - IAEA requirements for state system of nuclear materials control and accounting - Implementation of safeguards at facilities - Organization of nuclear materials control and accounting at facilities - Experience of highly developed countries in the field nuclear materials control and accounting - Basic methods of destructive analysis - Basic methods of non-destructive analysis	Personnel of facility nuclear materials control and accounting departments; Instructors
3	Accounting of nuclear materials and preparation of accounts and reports	- Basic IAEA requirements for nuclear materials control and accounting and reporting - Basic principles of nuclear materials control	MC&A management of regulatory and controlling authorities and facilities; Personnel of

		and accounting and of reports preparation - Accounting documents and reports at facility - Contents, format and structure of reports to IAEA - Reports quality control - IAEA statements on state reports	nuclear materials control and accounting departments at facilities; Instructors
4	Procedures of nuclear materials control and accounting	- Role of procedures in nuclear materials control and accounting activities - Procedure of facility control and accounting - Format of procedures review - Documents keeping and document systems	Personnel of nuclear materials control and accounting departments at facilities; Instructors
5	Introduction to measurement of nuclear materials	- Necessity for measurements - Requirements of the Additional Protocol - General principles of measurement - Measurement methods: methods of destructive analysis, of non-destructive analysis - Processing of measurements results - Measurement control – standards application	Personnel beginning to work in the field of measurement of nuclear materials
6	Statistics and control of measurements of nuclear materials	- Material balance - Measurement control program - Models of measurement error - Derivation of total dispersion - Sampling statistics - Statistics problems	Personnel working in the field of nuclear materials measurement; Instructors in this field

Appendix B.1. Ukrainian Training Needs Assessment Questionnaire

NEEDS of

_____

nuclear facility name

in training of nuclear materials control, accounting and measurement specialists

1. Number of specialists working at the site and their training needs

No.	NAME IN FULL	Position and duties,	Standing	Education, major, when and where graduated from	Advanced training: when and where	Required direction of advanced training

2. Does the site have a procedure according to which specialists in the above-mentioned fields are to go to advanced training periodically, pass qualification exams for the right to occupy a certain position or perform certain type of work:

☐ YES ☐ NO

3. Has your facility developed training programs for lower and middle rank specialists?

☐ YES ☐ NO

4. Does your site need instructors training to teach lower and middle rank specialists?

☐ YES ☐ NO

If YES, fill out the following table:

No.	Instructors specialization	Required number of instructors	Instructors advanced training periodicity (years)
1			
2			
3			

4			
5			
6			
7			
8			

5. De the procedures developed at the facility cover all aspects of activities, associated with nuclear material control and accounting?

☐ YES ☐ NO

6. Does your facility perform non-destructive analysis of nuclear material?

☐ YES ☐ NO

If YES, fill out the table below:

No.	Type of non-destructive analysis	Equipment for analysis	Manufacturer (country)	Main characteristics of equipment
1				
2				
3				

7. Do your nuclear material measurement specialists need advanced training?

☐ YES ☐ NO

8. If your facility does not perform non-destructive analysis, are you planning to perform non-destructive analysis in the future?

☐ YES ☐ NO

If YES, do you need to train non-destructive analysis specialists?

☐ YES ☐ NO

What number of specialists, do you think need training?_____

9. Will your facility be able to organize lower and middle rank specialists training in the field on nuclear materials control and accounting, if the facility gets assistance in instructors training and receives teaching and presentation materials?

☐ YES ☐ NO

How much time does the facility need for adequate training on site?

☐ 1 year ☐ years ☐ 3 years

What does the site need for this:

- Receive a license ☐
- Develop training programs ☐
- Train instructors ☐
- Purchase required equipment ☐
- Prepare proper facilities ☐
- Other needs ☐

10. Does your facility need advanced training for specialists in the field of protection of information including information on electronic media?

☐ YES ☐ NO

11. If your site specialists need training, fill out the following table:

No.	Activity	Number of specialists who need			
		advanced training	retraining	initial training	instructor training
1	Development of procedures for nuclear materials control and accounting				
2	Nuclear materials control and accounting				
3	Measurement of nuclear material, non-destructive analysis				
4	Management of nuclear materials control and accounting system				

Signature of nuclear facility official

NEEDS of

_____

nuclear facility name

in training of specialists in the field of physical protection of nuclear material and nuclear facilities.

1. Number of specialists, working at the site and their training needs

No.	NAME IN FULL	Position and duties	Standing	Education, major, when and where graduated from	Advanced training: when and where	Required direction of advanced training

2. Does the site have a procedure, pursuant to which physical protection specialists are to go to advanced training periodically, pass qualification exams for the right to occupy a certain position or perform certain type of work:

☐ YES ☐ NO

3. Has your facility developed training programs for lower and middle rank specialists ?

☐ YES ☐ NO

4. Does your site need instructors training to teach lower and middle rank specialists?

☐ YES ☐ NO

If YES, fill out the following table:

No.	Instructors specialization	Required number of instructors	Instructors advanced training periodicity (years)
1			
2			
3			
4			
5			

6			
7			
8			

5. De the procedures developed at the facility cover all aspects of activities, associated with physical protection of nuclear material and nuclear facility?

☐ YES ☐ NO

6. Will your facility be able to organize lower and middle rank specialists training on physical protection of nuclear materials if the facility receives assistance in training of instructors and receives basic training and presentation material?

☐ YES ☐ NO

How much time does the facility need for adequate training on site?

☐ 1 year ☐ 2 years ☐ 3 years

What does the site need for this:

Receive a license ☐

Develop training programs ☐

Train instructors ☐

Purchase required equipment ☐

Prepare proper facilities ☐

Other needs ☐

7. Do the guard force specialists in the field of engineered and technical protection means need advanced training?

☐ YES ☐ NO

8. Does your facility need advanced training for specialists in the field of protection of information including information on electronic media?

☐ YES ☐ NO

9. Do the specialists of your site need advanced training in the field of assessment of vulnerability of physical protection systems and their operational testing?

☐ YES ☐ NO

10. If your site specialists need training, fill out the following table:

No.	Activity	Number of specialists who need			
		advanced training	retraining	initial training	instructor training
1	Design of physical protection system				
2	Commissioning and operation of physical protection systems				
3	Management of physical protection system				

Signature of nuclear facility official and date

Appendix B.2. Ukrainian Training Needs Assessment Facility Visit Report

Report

on completion of Tasks 3 – 5 of Contract 188723, dated 09/24/03 between Sandia National Laboratories and Kiev Institute for Nuclear Research

According to Contract 188723 there were completed the following works were completed:

According to Task 3 the final version of a questionnaire have been prepared for determine training needs of Ukrainian nuclear facilities on physical protection, accounting and control of nuclear material. The questionnaire was dispatched on all nuclear facilities, to control and regulating authorities of Ukraine. In October GKTC employees have visited all working NPP of Ukraine for faster and reliable gathering the information:

the South-Ukrainian NPP - V.Gavrilyuk, A.Gavrilyuk

the Zaporozhye NPP - V.Gavrilyuk, O.Romanova

the Khmelnitskiy NPP - V.Gavrilyuk, S.Trachevsky

the Rivno NPP - V.Gavrilyuk, S.Trachevsky

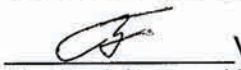
According to Task 4 the filled questionnaires were received from each nuclear facilities, Energoatom, Ministry of Fuel and Energy, USCNR. GKTC was analyzed and integrated the information collected according to the received data (data are enclosed with this report).

According to Task 5 workshop participants prepared and transferred in GKTC report thesis. All necessary presentation materials in Ukrainian and Russian to support the two-day workshop were made. The handout materials were prepared for each participants (the handout materials is enclosed with this report).

Copy of draft material have been sent by e-mail on November 14, 2003 to Deborah Dickman, PNNL, Debbie.dickman@pnl.gov and Jozef Kuzminski, LANL, josephk@lanl.gov, in addition to the copies submitted to the SDR.

This Report indicates that all works under Task 3, Task 4, and Task 5 of Contract 188723 were completed successfully and is the foundation for the payment in accordance with Contract payment schedule

Kiev Institute for Nuclear Research
Contractor Representative


Victor I. Gavrilyuk
Head of George Kuzmycz
MPC&A Training Center

November 14, 2003

Appendix B.3. Ukrainian Training Needs Assessment Questionnaire Integrated Report

SURVEY OF NEEDS IN TRAINING OF NUCLEAR MATERIAL ACCOUNTING AND CONTROL

1. Number of NMC&A specialists working at the nuclear facilities, regulating and control authorities of Ukraine:

Facility/ organization	Number of person	Position level		Background	
Chornobyl NPP	6	management engineers	– 2 – 4	High technical	– 6
Rivno NPP	6	management engineers	– 1 – 5	High technical	– 6
Khmelnitski NPP	12	management engineers	– 7 – 5	High technical Secondary technical	– 10 – 2
South-Ukrainian NPP	7	management engineers	– 4 – 3	High technical	– 7
Zaporozhye NPP	11	management engineers	– 1 – 10	High technical	– 11
NPPs	**42**	**Management Engineers**	**15 27**	**High technical Secondary technical**	**40 2**
Sevastopol INE&I	2	engineers	– 2	High technical	– 2
Kharkov IPh&T	10	management engineers researchers	– 4 – 2 – 4	High technical	– 10
KINR	5	engineers researchers	– 4 – 1	High technical	– 5
Institutes	**17**	**Management Engineers Researchers**	**4 8 5**	**High technical**	**17**
Energoatom	2	engineers	– 2	High technical	– 2
Ministry of Fuel and Energy	2	experts	– 2	High technical	– 2
USCNR	5	management experts	– 1 – 4	High technical Secondary technical	– 4 – 1
Regulating and Control authorities	**9**	**Management Experts**	**1 8**	**High technical Secondary technical**	**8 1**
Total	**66**	**Management Engineers Experts Researchers**	**20 33 8 5**	**High technical Secondary technical**	**63 3**

2. Presence at the facilities and organizations procedures according to which specialists in the above-mentioned fields are to go to advanced training periodically, pass qualification exams for the right to occupy a certain position or perform certain type of work:

NPPs	Yes	
Sevastopol INE&I		No
Kharkov IPh&T	Yes	
KINR	Yes	
Energoatom	Yes	
Ministry of Fuel and Energy	Yes	
USCNR		No

3. Presence at facilities and organizations training programs for lower and middle rank specialists:

ChNPP		No
SUNPP		No
RNPP	Yes	
KhNPP	Yes	
ZNPP	Yes	
Institutes		No
Regulating and Control Authorities		No

4. Presence of the need instructors training to teach lower and middle rank specialists:

ChNPP	Yes	
RNPP	Yes	
KhNPP		No
SUNPP	Yes	
ZNPP *only for training lower rank specialists*	Yes	
Institutes	Yes	
Regulating and Control Authorities		No

Facility / Organization	Instructors specialization	Required number of instructors	Instructors advanced training periodicity (years)
Chornobyl NPP	MC&A at the facility	3	2
Rivno NPP	Neutron Physics processes	1	3
South-Ukraine NPP	Measurement of NM MC&A at the facility	1 1	2 2
ZNPP	Accounting of NM, safekeeping, oversight; Information, documents and reports on safeguards; developing procedures; accounting and control under the Additional Protocol and IAEA activities. Calculation of NM quantities in spent fuel. Developing procedures for measuring NM in spent and fresh fuel. Electronic data protection.	2 2 2 1	1 1 1 1
KhNPP			
Sevastopol INE&I	Methods for control and accounting of NM. The non-destructive analysis of nuclear material. Legislative and regulatory acts on non-proliferation, accounting and control of NM.	1 1 1	2 2 2
Kharkov IPh&T	Measuring NM, non-destructive control. Computerized accounting and control of NM. Developing procedures for accounting and control of NM. Information, documents and reports on safeguards at facility level. Control of NM at facility level. Data protection. NM accounting, safekeeping and oversight.	4 2 2 2 2 2 2	1 1 1 1 1 1 1
KINR	Control and accounting of NM. NM non-destructive control methods.	2 2	1 1

5. Presence of procedures developed at facilities /organizations cover all aspects of activities, associated with nuclear material control and accounting:

ChNPP		No
KhNPP		No
ZNPP		No
RNPP	Yes	
SUNPP	Yes	
Sevastopol INE&I	Yes	
Kharkov IPh&T		No
ИЯИ	Yes	

6. Performance at facilities non-destructive analysis of nuclear material:

NPP		**No**
Institutes	**Yes**	

Facility / organization	Type of non-destructive analysis	Equipment for analysis	Manufacturer (country)	Main characteristics of equipment
Sevastopol INE&I	Gamma-analysis СЯТ	U-Pu InSpector	USA Canbera	software Procount Software Genie-2000 Software QA Software LEGE Detector for UPu Big MAC Cryostat
Kharkov IPh&T	Gamma- spectrometry	1000 GC1818/S	USA Canbera	Portable NIM Detector Ge Big MAC portable Cryostat
		1200 1230 7419B	USA Canbera	**InSpector IMCA** Spare Batteries (2 pc) Detector NaI UPu InSpector MCA
		INSP-12 S-535-C S-503-C S-504-C S-505-C GL0515R 7935-2F/ 2056-C 2M.5/2 AM241-X	USA Canbera	**UPu InSpector** software Procount Software Genie-2000 Software QA Software LEGE Detector for UPu Big MAC Cryostat **Multichan. Analizer DAVIDSON** Detector NaI
	Active counter of neutron coincidences	JSR-12 JCC-51 NCC-Win COMPAQ PRESARIO Software	LANL	**Neutron Coincidence Analizer AWCC** LANL Neutron Analysis Software Pentium, (appurtenant IAEA) WIN 95, NCC (engl)
KINR	Spectroscopy, gamma and X-ray radiation. Methods MGAU, MGA Methods FRAM	U-Pu InSpector HPGe coaxial detector. Digital analyzer	USA Canbera	ПШПВ=580эв(122кэв), HPGe: S=1000мм^2 Thikness 10мм ПШПВ=1,8кэв (1,33Мэв) Efficiency 60%

7. Needs of nuclear material measurement specialists advanced training:

NPP	**Yes**	
Institutes	**Yes**	
USCNR	**Yes**	

8. Presence of the need to perform non-destructive analysis at the facilities:

NPP	**Yes**	

Presence of the need to train non-destructive analysis specialists:

NPP	**Yes**	
Institutes	**Yes**	
USCNR	**Yes**	

Number of specialists, which need training:

RNPP	2
CHNPP	6
KhNPP	5
SUNPP	7
ZNPP	2
Sevastopol INE&I	2
Kharkov IPh&T	10
KINR	2
USCNR	3
Total	**39**

9. Ability to organize at the facility lower and middle rank specialists training in the field on nuclear materials control and accounting, if the facility gets assistance in instructors training and receives teaching and presentation materials:

NPP	**Yes**	
Institutes	**Yes**	

Time that facility needs for to organize adequate training on site:

Facility	1year	2 year
ChNPP		+
RNPP		+ after instructors training
ZNPP		+
KhNPP		+
Sevastopol INE&I	+	
Kharkov IPh&T	+	
KINR	+	

To organize adequate training the site needs:

	ChNPP	RNPP	SUNPP	ZNPP	KhNPP	SINE&I	KhIPh&T	KINR
Receive a license	-	-	-	-	-	-	Yes	-
Develop training programs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Train instructors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Purchase required equipment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-
Prepare proper facilities	Yes	Yes	Yes	-	-	Yes	Yes	-
Other needs	There is no financing Need help in development of methodical materials							

10. Presence of facilities/organizations needs advanced training for specialists in the field of protection of information including information on electronic media:

NPP	**Yes**	
Institutes	**Yes**	
Regulating and Control authorities	**Yes**	

11. The need for training on the following activities:

№	Activity	Number of specialists who need			
		advanced training	retraining	initial training	instructor training
1	Development of procedures for nuclear materials control and accounting	ChNPP – 6 KhNPP – 5 SUNPP – 7 ZNPP – 1 RNPP – 1 SINE&I – 2 KINR – 3 KhIPh&T – 4	ChNPP – 1 SUNPP – 4 ZNPP – 1 KINR – 2	ChNPP – 1 SUNPP – 2 ZNPP – 5 KINR –1	ChNPP – 3 SUNPP – 1 ZNPP – 1 SINE&I –2 KINR –2 KhIPh&T – 4
2	Nuclear materials control and accounting	ChNPP – 6 KhNPP – 7 SUNPP – 7 ZNPP – 1 RNPP – 3 SINE&I – 2 KINR – 3 KhIPh&T – 4	ChNPP – 1 SUNPP – 4 ZNPP – 1 KINR – 2	ChNPP – 1 SUNPP – 2 ZNPP – 5 KINR – 1	ChNPP – 3 SUNPP – 1 ZNPP – 1 SINE&I –2 KINR – 2 KhIPh&T – 2
3	Measurement of nuclear material, non-destructive analysis	ChNPP – 6 KhNPP – 6 SUNPP – 7 SINE&I – 2 KINR – 3 KhIPh&T – 7	ChNPP – 1 KINR – 2	ChNPP – 1 SUNPP – 7 ZNPP – 6 RNPP – 2 USCNR – 3 KINR – 1	ЧАЭС – 3 ЮУАЭС – 1 ЗАЭС – 2 SINE&I - 2 KINR – 2 KhIPh&T – 2
4	Information, documents and reports on safeguards at the facility level	ChNPP – 6 KhNPP – 2 SUNPP – 4 ZNPP –1 RNPP – 1 SINE&I –2 USCNR – 5 KINR – 3 KhIPh&T – 4	ChNPP – 1 SUNPP – 2 ZNPP – 1 KINR – 2	ChNPP – 1 SUNPP – 2 ZNPP – 5 KINR – 1	ChNPP – 3 SUNPP – 1 ZNPP – 1 SINE&I – 2 KINR – 2

5	Nuclear materials control at facility/unit level	ChNPP – 6 KhNPP – 3 SUNPP – 4 RNPP – 2 SINE&I –2 KINR – 3 KhIPh&T – 4	ChNPP – 1 SUNPP – 2 KINR – 2	ChNPP – 1 SUNPP – 2 KINR – 1	ChNPP – 3 SUNPP – 1 SINE&I –2 KINR – 2 KhIPh&T – 2
6	Calculation of nuclear materials quantity in spent fuel and fresh fuel			ZNPP – 5	ZNPP – 2
7	Developing procedures for measuring nuclear materials			ZNPP – 3	ZNPP – 2
8	Control and accounting of nuclear materials under the Additional Protocol	ZNPP – 1	ZNPP – 1	ZNPP – 5	ZNPP – 1
9	IAEA activities under the Additional Protocol	ZNPP – 1	ZNPP – 1	ZNPP – 5	ZNPP – 1
10	Electronic data protection	KhIPh&T – 2		ZNPP – 3 KhIPh&T – 2	ZNPP – 1 KhIPh&T – 2
11	Automated control and accounting of nuclear materials	KhIPh&T – 4			KhIPh&T – 2
*ZNPP offers to organize annual general courses for the higher management “Activities in the area of the State System of Accounting and Control at the National level and at the level of the nuclear facility” and “IAEA safeguards in Ukraine and at the site”					

Activity	Number of specialists who need							
	advanced training		retraining		initial training		instructor training	
	NPP	Institutes	NPP	Institutes	NPP	Institutes	NPP	Institutes
Development of procedures for nuclear materials control and accounting	20	9	6	2	8	1	5	4
Nuclear materials control and accounting, safekeeping and oversight	24	9	6	2	8	1	5	4
Measurement of nuclear material, non-destructive analysis	19	12	1	2	16	1 USCNR - 3	6	4
Information, documents and reports on safeguards at the facility level	14	9 USCNR - 5	4	2	8	1	5	4
Nuclear materials control at facility/unit level	15	9	3	2	3	1	4	4
Calculation of nuclear materials quantity in spent fuel and fresh fuel					5*		2*	
Developing procedures for measuring nuclear materials					3*		2*	

Control and accounting of nuclear materials under the Additional Protocol	1*	1*	5*	1*
IAEA activities under the Additional Protocol	1*	1*	5*	1*
Electronic data protection	2		5	3
Automated control and accounting of nuclear materials	4**			2**
Total	**151**	**32**	**72**	**68**

* - only ZNPP

** - only KhIPh&T

CONCLUSIONS

The number of staff involved in accounting and control of nuclear materials at nuclear facilities as well as in the regulating and managing authorities is 68 persons, of whom:
NPPs – 42,
Institutes – 17,
Regulating and managing authorities – 9.

The needs analysis shows that all nuclear facilities and organizations without exception require both initial training as well as refresher/upgrading training for managerial and engineering staff. Instructors should be trained and instructional materials provided to provide on-site training for middle and lower level staff.

In the future training, a special attention will be paid to non-destructive analysis of nuclear materials (Additional Protocol).

The table lists the most important areas of activities for which training should be provided as well as the number of staff to be trained:

№	Activity	Number of specialists who need			
		advanced training	retraining	initial training	instructor training
1	Development of procedures for nuclear materials control and accounting	28	8	9	13
2	Accounting of nuclear materials, safekeeping and oversight	30	8	9	11
3	Measurement of nuclear material, non-destructive analysis	31	3	18	12
4	Information, documents and reports on safeguards at facility level	27	6	9	11
5	Nuclear materials control at facility/unit level	22	5	4	10
	Total	**138**	**30**	**49**	**57**

There is a need to organize annual general courses for the higher management “Activities in the area of the State System of Accounting and Control at the National level and at the level of the nuclear facility” and “IAEA safeguards in Ukraine and at the site”

NEEDS REVIEW

TRAINING THE STAFF FRO PHYSICAL PROTECTION OF NUCLEAR MATERIALS AND NUCLEAR FACILITIES

1. Number of Physical Protection specialists working at the nuclear facilities, regulating and control authorities of Ukraine:

Facility/ organization	Number of person	Position level		Background	
ChNPP	55	management engineers shift supervisors	– 6 – 44 – 5	High technical High humanitarian Secondary technical	– 34 – 9 – 12
RNPP	19	management engineers technician	– 2 – 13 – 4	High technical High humanitarian Secondary technical	– 9 – 5 – 5
KhNPP	23	management engineers technician	– 2 – 12 – 9	High technical High humanitarian Secondary technical	– 12 – 5 – 6
SUNPP	15	management engineers technician	– 1 – 13 – 1	High technical High humanitarian Secondary technical	– 10 – 1 – 4
ZNPP	13	management engineers	– 1 –12	High technical High humanitarian Secondary technical	– 7 –2 – 4
NPPs	**125**	**management engineers technician**	**17 94 14**	**High technical High humanitarian Secondary technical**	**72 22 31**
Sevastopol INE&I	5	management engineers	– 1 – 4	High technical	– 5
Kharkov IPh&T	8	management engineers	– 3 – 5	High technical	– 8
KINR	6	management researchers engineers	– 1 – 1 – 4	High technical	– 6
Institutes	**19**	**management researchers engineers**	**5 1 13**	**High technical**	**19**
Energoatom	3	management engineers	– 1 – 2	High technical High humanitarian	– 1 – 2
Ministry of Fuel and Energy	7	management experts	– 3 – 4	High technical High humanitarian	– 5 – 2
USCNR	7	management experts	– 1 – 6	High technical High humanitarian	– 5 – 2
Regulating and control authorities	**17**	**Management Experts**	**5 12**	**High technical High humanitarian**	**11 6**
Total	**161**	**management researchers engineers experts technician**	**27 1 107 12 14**	**High technical High humanitarian Secondary technical**	**102 28 31**

2. Availability of procedure in place at facilities/organizations, under which the above mentioned specialists are required to mandatory take refresher courses, pass qualification examinations that entitle them to occupy certain positions or perform certain duties:

ChNPP	Yes	
RNPP	Yes	
KhNPP	Yes	
SUNPP	Yes	
ZNPP		No

Sevastopol INE&I		No
Kharkov IPh&T	Yes	
KINR		No
Energoatom	Yes	
Ministry of Fuel and Energy		No
USCNR	Yes	

3. Availability of training programs for middle and lower level staff at facilities/organizations:

ChNPP	Yes	
KhNPP	Yes	
SUNPP	Yes	
RNPP		No
ZNPP		No
Institutes		**No**
Regulating and control authorities		**No**

4. Existing needs to train instructors for training middle and lower level staff at facilities/organizations:

NPPs	**Yes**	
Institutes	**Yes**	
Energoatom	Yes	
Ministry of Fuel and Energy		нет
USCNR	Yes	

Facilities/organizations	Area of instructors' expertise	Required # of instructors	Frequency of instructor retraining (years)
ChNPP	Organization of physical protection Introduction of automated physical protection systems	1 1	3 3
RNPP	Instructors: Training operators, Unit alarm station, Central alarm station. Training maintenance personnel for technical means of physical protection. Physical protection training and initial briefing for NPPs personnel Drafting documents	 2 2 2 2	 5 3 5 5
KhNPP	Physical protection of NM, nuclear facilities, and radiation sources, and radioactive wastes. Procedure for drafting documents for special inspections and provision of access.	1 1	3 3
SUNPP	Maintenance of Electronic system of safety «ADVANTOR» Maintenance of accesses system «Zirconium» Maintenance of X-ray inspection system LineScan and metal detection system Santria Maintenance of engineering and technical means of security	1 1 1 2	2 2 2 2
ZNPP	Designing physical protection means Setup of engineering and technical means of security, data automatic control system. Procedure development. Vulnerability assessment of physical protection means.	1 1 1 1	2 1 2 2
NPPs		**21**	**1 – 5**

Sevastopol INE&I	Ukrainian legislative and regulatory acts on physical protection. Developing physical protection procedures at facilities. Design and vulnerability assessment. Interaction with the state authorities and anti-terrorism activities. Design, installation, adjustment, operation and maintenance of protection devices/means.	1 1 2 2 2	2 2 2 2 2
KhIPh&T	Development of physical protection projects for NM and nuclear facilities. Designing technical devices for protection and security of data on nuclear materials and facilities. Development of physical protection procedures. Installation and adjustment of technical security devices. Testing physical protection systems, vulnerability assessment. Operation of technical security devices. Maintenance and repairs of technical security devices. Managing physical protection of facility in regular and emergency situations.	2 2 2 2 2 2 2	2 2 2 2 2 2 2
KINR	Equipment maintenance instructor .	2	2
Institutes		**24**	**2**
Energoatom	Development of physical protection projects. Testing physical protection systems and vulnerability assessment . Managing physical protection of facility in regular and emergency situations .	1 1 1	2 2 2
Ministry of Fuel and Energy			
USCNR	In the area of oversight In the area of licensing	3 2	3
Regulating and managing authorities		**8**	**2- 3**
Total		**53**	

5. Availability of procedures at facilities/organizations that cover all aspects related to physical protection of nuclear materials:

ChNPP		No
RNPP		No
khNPP		No
SUNPP	Yes	
ZNPP	Yes	
Sevastopol INE&I		No
Kharkov IPh&T	Yes	
KINR		No
Regulating and managing authorities		No

6. Possibilities for organizing NM physical protection training for middle and lower level staff provided there is assistance with training the instructors and baseline instructional materials :

NPPs	**Yes**	
Institutes	**Yes**	
Regulating and managing authorities	**Yes**	

Time required for organizing full-fledged on-site training:

Facility	Year 1	Year 2	Year 3
ChNPP			+
RNPP		+	
KhNPP		+	
SUNPP			+
ZNPP			+
Institutes	**+**		
Energoatom		+	
Ministry of Fuel and Energy			+
USCNR		+	

To organize full-fledged on-site training, the facilities need:

	ChNPP	RNPP	KhNPP	SUNPP	ZNPP	SINE&I	KhIPh&T	KINR
Obtain license	Yes			Yes	Yes		Yes	
Develop training programs	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Train instructors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Purchase the necessary equipment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prepare the necessary rooms/offices	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Other needs	Yes	Yes	Yes	Yes		Yes	Yes	

7. Existing need to provide retraining in technical devices and equipment for security personnel at facilities:

NPPs	**Yes**	
Institutes	**Yes**	
Energoatom	Yes	
Ministry of Fuel and Energy		No
USCNR	Yes	

8. Existing need to provide retraining for data protection staff (including electronic data):

ChNPP	Yes	
RNPP	Yes	
KhNPP	Yes	
SUNPP	Yes	
ZNPP		No
Institutes	Yes	
Regulating and managing authorities	Yes	

9. Existing need to provide retraining for staff responsible for vulnerability assessment and testing of physical protection systems:

NPP	Yes	
Institutes	Yes	
Regulating and managing authorities	Yes	

10. The main topics the facilities/organizations staff would like to be covered during training:

	Topics	advanced training	retraining	initial training	instructor training
ChNPP	-	-	-	-	-
RNPP					
KhNPP	Legislative and regulatory framework International experience. Classification of radioactive waste and ionizing irradiation sources from viewpoint of physical protection. Practical tasks for ensuring physical protection. Ensuring physical protection at all stages of nuclear facilities.	+ + + +	+ + + +	+ + + +	+ + + +
SUNPP	Requirements to the state systems of physical protection. Requirements to special inspection and access procedures.			+ +	
Sevastopol INE&I	Legislative and regulatory framework Development of procedures	+ +		+ +	+ +
Kharkov IPh&T	Operation and maintenance of hard and software for production of passes. Programming functions for physical protection systems.	+ +		+ +	
KINR					
Energoatom	Methods for inspecting physical protection facilities. Methods for testing physical protection systems to assess their vulnerability. Simulation of emergency situations to test physical protection facilities	+ + +	 + 	+ + +	+ + +

Ministry of Fuel and Energy	Development of physical protection projects. Design of technical security and data protection devices. Development of procedures. Installation and adjustment of technical devices. Testing physical protection systems. Vulnerability assessment. Physical protection management	 + + 	+ + + + +	+ + + + 	
USCNR	Inspecting the status of NM physical protection. Inspecting the technical devices for physical protection of nuclear facilities. Oversight of physical protection systems for ionizing irradiation sources and radioactive waste . Licensing in the area of physical protection of nuclear facilities, radioactive waste and ionizing irradiation sources .	+ + + +	+ + + +	+ + + +	+ + + +

CONCLUSIONS

The number of staff involved in accounting and control of nuclear materials at nuclear facilities as well as in the regulating and managing authorities is 161 persons, of whom:
NPPs – 125,
Institutes – 19,
Regulating and managing authorities – 17.

There is a need to provide training for managerial and engineering staff. It is also necessary to provide regular training for the security personnel at nuclear facilities.

All nuclear facilities require training instructors who would train middle and lower level staff.

№	Activity	# of staff that require training			
		advanced training	retraining	initial training	instructor training
1	Development of physical protection projects for nuclear materials and nuclear facilities	18	11	8	7
2	Designing of technical means of information security and protection of NM and facility	16	6	5	6
3	Development of physical protection procedures	20	15	16	9
4	Assembling and setup of engineering and technical means of security. Methods for Testing physical protection systems to assess their vulnerability.	23	11	20	10
5	Operation of technical security devices	17	6	24	8
6	Maintenance and repairs of technical security devices	23	7	21	8
7	Control of facility physical protection under ordinary and emergency situation.	21	10	42	7
	Total	**138**	**65**	**136**	**55**

Appendix B.4. Ukrainian Training Needs Assessment Workshop Agenda and Participants List

Agenda

#	Presentation	Tame
	December 4	
1	***Opening of a workshop***	**9^{00}**
	V. Gavrilyuk	9^{00} - 9^{15}
	D.Beck	9^{15} - 9^{30}
	Training Needs of specialists of Ukrainian Nuclear Facilities	
2	ZNPP	
	V.Kulinich	9^{30} – 9^{50}
	V.Kulbakova	9^{50} –10^{10}
	Break	**10^{10} - 10^{20}**
3	***SUNPP***	
	I.Zhebet	10^{20} – 10^{40}
	D.Sokolov	10^{40} – 11^{00}
	Coffee-break	*11^{00} – 11^{20}*
4	***KhNPP***	
	Yu.Kuchmiy	11^{20} – 11^{40}
	M.Gashev	11^{40} – 12^{00}
	Break	*12^{00} - 12^{10}*
5	***RNPP***	
	A.Beloborody	12^{10} – 12^{30}
	V.Grabko	12^{30} – 12^{50}
	Lunch	*12^{50} – 13^{50}*
6	***ChNPP***	
	E.Katunin	13^{50} – 14^{10}
	A.Shatsman	14^{10} – 14^{30}
	Break	14^{30} - 14^{40}
7	***Sevastopol Institute of Nuclear Energy and Industry***	
	K.Guschin	14^{40} – 15^{00}
	V.Kiriyachenko	15^{00} - 15^{20}
	Break	*15^{20} – 15^{30}*
8	***Kharkov Institute of Physics and Technology***	
	V.Mikhajlov	15^{30} - 15^{50}
	D.Kutniy	15^{50} – 16^{10}
	Reception 17^{00}	

December 5		
9	***Kiev Institute for Nuclear Research***	
	V.Lavrinenko	9^{00} - 9^{20}
	V.Makarovski	9^{20} - 9^{40}
	Break	*9^{40} – 9^{50}*
10	***NAEK***	
	V.Semerej	9^{50} -10^{10}
	Yu.Abramov	10^{10} - 10^{30}
	Break	*10^{30}- 10^{40}*
	Training Needs of specialists regulatory authority and control authority level	
11	***USCNR***	
	I.Kunitski	10^{40} – 11^{00}
	E.Dikov	11^{00} – 11^{20}
	Coffee - break	*11^{20} - 11^{40}*
12	***Ministry of Fuel and Energy of Ukraine***	
	P.Ivanov	11^{40} – 12^{00}
	A.Afanasiev	12^{00} – 12^{20}
	Lunch	*12^{20} - 13^{20}*
13	The role of GKTC in raising the level of MPC&A specialist's skill. Difficulties of work and future prospect. V.Gavrilyuk	13^{20} - 13^{50}
	Break	**13^{50}- 14^{00}**
14	General discussion	14^{00} - 15^{00}
	Coffee- Break	**15^{00} – 15^{20}**
15	Summarizing of Workshop	15^{20} - 16^{20}

Participants

David Beck	Sandia National Laboratories, USA
Deborah Dickman	Pacific Northwest National Laboratory, USA
Abramov Yuriy Aleksandrovich	Energoatom National Nuclear Power Generating Company, state enterprise, lead engineer, fuel disposition div.
Artyukh Ivan Aleksandrovich	Zaporozhye Nuclear Power Plant, protected enterprise, assistant director general
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Belousova Lidiya Petrovna	Energoatom National Nuclear Power Generating Company, state enterprise, lead engineer, fuel disposition div.
Gavrilyuk Viktor Ivanovich	Nuclear Research Institute, National Academy of Sciences of Ukraine, head, Training Center
Grabko Viktor Vladimirovich	Roven Nuclear Power Plant, protected enterprise, chief, nuclear safety division
Gorbachenko Oleg Viktorovich	Zaporozhye Nuclear Power Plant, protected enterprise, lead engineer, production engineer, physics calculations group leader, nuclear safety division
Gushchin Konstantin Yur'yevich	Sevastopol National Institute of Nuclear Energy and Industry, pro-rector for YaR [nuclear reactors?], physical protection, and special operations
Zhebet Ivan Romanovich	Southern Ukraine Nuclear Power Plant, protected enterprise, deputy director general for operations
Zadorozhnyy Yuriy Vladimirovich	Deputy chief, division of nuclear weapons nonproliferation assurances of Ukrainian State Nuclear Regulatory Commission
Zykov Nikolay Petrovich	Roven Nuclear Power Plant, protected enterprise, chief, division of physical protection and special operations
Istomina Larisa Leonidovna	Southern Ukraine Nuclear Power Plant, protected enterprise, head of laboratory for nuclear fuel, nuclear safety division
Kiriyachenko Vladimir Aleksandrovich	Sevastopol National Institute of Nuclear Energy and Industry, dean, nuclear power plant power-engineering faculty
Kunitskiy Igor' Nikoleyevich	Ukrainian State Nuclear Regulatory Commission, deputy chief of administration for physical protection and special operations
Kuchmiy Yuriy Ivanovich	Khmel'nitskiy Nuclear Power Plant, protected enterprise, physical protection division chief
Lavrinenko Vasiliy Aleksandrovich	Nuclear Research Institute, National Academy of Sciences of Ukraine, deputy director for general affairs
Makarovskiy Vladimir Nikolayevich	Nuclear Research Institute, National Academy of Sciences of Ukraine, chief reactor engineer
Makhaylov Valeriy Aleksandrovich	Scientific Production Center Kharkov Physics and Engineering Institute, deputy director general for security and international relations
Mishchenko Vadim Viktorovich	Ministry of Fuel and Energy, deputy chief of Administration for Physical Protection and Emergency Response
Semerey Vladimir Danilovich	Energoatom National Nuclear Power Generating Company, state enterprise, deputy department director, chief of division of physical protection, nuclear installations, and nuclear materials
Titov Sergey Nikolayevich	Khmel'nitskiy Nuclear Power Plant, protected enterprise, deputy chief, div. of nuclear safety

Tovkanets Viktor Yefimovich	Scientific Production Center Kharkov Physics and Engineering Institute, chief MC&A services
Shatsman Andrey Vladislavovich	Chernobyl DSP, chief engineer for power-generating units
Shumilin Valeriy Nikolayevich	Chernobyl DSP, deputy chief, div. of physical protection policy

Appendix B.5. Ukrainian Training Needs Assessment Workshop Presentations

Presentation summaries included are (listing below follows order printed, not agenda):

- **Zaporozhye NPP (ZNPP)**
  - Current status of the experts training on accounting and control of nuclear materials (NM) at Zaporizhzhja NPP (ZNPP).....B.5-3
- **Yuzhnoukrainsk (South-Ukraine) NPP (SUNPP)**
  - Current status and perspectives of the staff training of physical protection (PP) issues at South-Ukrainian NPP (SU NPP) B.5-3
  - Current status and perspectives of the staff training of accounting and control of NM issues at South-Ukrainian NPP (SU NPP).....B.5-4
- **Khmelnytskyy NPP (KhNPP)**
  - Current status and planes of the staff training of PP issues at Khmelnitsk NPP (Kh NPP).....B.5-5
- **Rovno NPP (RNPP)**
  - Current status and plans of the staff training of PP issues at Rivne NPP (Rv NPP).....B.5-5
  - Current status and plans of the staff training of accounting and control of NM issues at Rivne NPP (Rv NPP).....B.5-6
  - General goals and requirements of personnel training at Rivne.....B.5-8
  - General requirements to the specialists of Rivne NPP involved in accounting and control of nuclear materials B.5-8
  - The order of training and admission to independent work B.5-9
  - Organizational Structure of Nuclear Fuel Department at Rivne B.5-11
  - Responsibilities of Nuclear Fuel Department B.5-11
- **Sevastopol Institute of Nuclear Energy and Industry (SINEI)**
  - The state and prospects of education of specialists on physical protection, accounting and control of nuclear materials in SINEI.....B.5-12
- **Ukrainian Regulations**
  - Regulatory documents on the accounting & control of NM in use...B.5-17
- **Chernobyl NPP (ChNPP)**
  - Current status and plans of the staff training of PP issues at Chernobyl NPP (C NPP).....B.5-19

- Current status and plans of the staff training of accounting and control of NM issues at Chernobyl NPP (C NPP).....B.5-22

- **Kharkiv Institute of Physics and Technology (KIPT)**
  - Current status and plans of the staff training of NMCA issues at Kharkiv Physics technical institute B.5-22
  - Plans of the staff training in PP issues at Kharkiv Physics technical institute.....B.5-22

- **Kiev Institute for Nuclear Research (KINR)**
  - Needs in the staff training, advanced training in PP issues at the Kiev Institute of Nuclear researches B.5-23
  - Needs in the staff training on NMCA issues at the Kiev Institute of Nuclear researches (KINR) B.5-23

- **National Nuclear Energy Generating Company Energoatom**
  - Needs in the staff training on PP issues at NAEK ENERGOATOM, National energy generating company B.5-23
  - Current status and needs in the staff training on NMCA issues at NAEK ENERGOATOM, National energy generating company B.5-24

- **State Nuclear Regulatory Committee of Ukraine (USNRC)**
  - Needs in the staff training in PP issues at NAEK the State Committee for Nuclear Regulation (SCNR).....B.5-25
  - Needs in the staff training in NMCA issues of the Safeguards Department, Nuclear Weapons Non-Proliferation of the SCNR.....B.5-26

- **Ministry of Fuel and Energy of Ukraine (UMFE)**
  - The PP Department of the Ministry of Fuels and Energy.....B.5-26

- **George Kuzmycz Training Center (GKTC)**
  - The role of the G. Kuzmich center in increasing the NM, PP experts qualification. Difficulties and future perspectives.....B.5-26

Current status of the experts training on accounting and control of nuclear materials (NM) at Zaporizhzhja NPP (ZNPP)

Represented by O. Gorbachenko

1. Quantity of NM in the spent fuel at ZNPP are being defined in the measurements ways only
2. Initial data to define the quantity of NM in the spent fuel at ZNPP is the initial enrichment of *(unknown abbreviation??)* and the average vertical burnout of the *(unknown abbreviation??)*
3. The schedule of the nuclear fuel irradiation is not being taking into account to define the quantity of the NM in the spent fuel at ZNPP
4. The additional calculations can allow us to justify the failures of this approach as well as necessity of the accounting of the schedule of the nuclear fuel irradiation The calculations of a such kind can be performed with the help of the ORIGEN software (ORNL USA). The training of the physics calculations groups personnel needs to attend the training how to use ORIGEN as well as to install ORIGEN at ZNPP.
5. In compliance with the State regulation On state system of accounting and control of NM, each applicant as well as the licentiate stipulate and support the system of measurements of NM, that is an integral part of the procedure of receiving, transportation of NM and so on..
6. To implement the requirements of the Main department of accounting and control at ZNPP the personnel of Nuclear Safety Department needs to get trained on methodics of fresh and nuclear fuel control, to receive proper equipment and financing of metrology and methodical documentation for procedures of NM measurements

Current status and perspectives of the staff training of physical protection (PP) issues at South-Ukrainian NPP (SU NPP)

Presented by Mr Zhebet, Deputy General Director on security at SU NPP

1. As of 01.11. 2003 - 7 experts out the staff of 14 (without internal troops staff at SU NPP being taken into account) have attended various courses on PP issues (1995-2003)
2. There are no instructors with the right to conduct training for the bottom and middle level staff available at the plant
3. we are proposing the following themes as the themes of the future courses:
    - defense against nuclear terrorism
    - defense against the threat of radiological danger
    - ways of control and defense of the radioactive materials
    - provision of the safe storage of NM and radioactive wastes and other sources of the ionizing radiation
    - international experience and recommendations on measures to detect and prevent thefts , illegal holding of NM, radioactive wastes and other sources of ionizing radiation

- development of provisions, directive regulations and recommendations on improvement of PP system of nuclear facilities
- international coordination of activity and managements of information on PP issues

4. we are also proposing to conduct a training of instructors able to train the bottom and middle level staff with the certificates obtaining, as a part of a general training set on the following topics:
   - operation, maintenance, control over electronic systems of PP
   - development and implementation of procedures of PP
   - maintenance of the technical and peculiar means of PP
   - means of the technical defense of information

Current status and perspectives of the staff training of accounting and control of NM issues at South-Ukrainian NPP (SU NPP)

Presented by Mr Zhebet, Deputy Chief Engineer on nuclear safety at SU NPP

The following duties are the part of the Department of nuclear safety functions in the sphere of accounting and control of NM at SU NPP:

1. receipt and registration of the fresh fuel at plant
2. keeping of the data base on accounting and circulation of NM at plant
3. monitoring of NM characteristics changes in a process if its operation
4. accounting and control of fresh and spent fuel
5. implementation of IAEA safeguards at SU NPP
6. inventory of NM in the operation process from the moment of its receipt to the moment of its transportation from the NPP
7. administration of work with the IAEA inspectors in respect of preparation and conducting of analysis of availability and circulation of nuclear fuel at the site

Three experts from SU NPP have attended the training on the mentioned topics. I do consider necessary to go on with the training of the SU NPP staff.

Basing on the said above I propose to expand the set of topics in the part of the accounting and control of NM towards the following directions:

1. use of automatic accounting of NM
2. requirements towards safe storage of NM
3. requirements towards safe transportation of NM

4. requirements towards systems of an unauthorized clearance to NM
5. requirements towards systems of surveillance over NM
6. training of instructors to train staff of the bottom and middle level on issues of accounting and control of NM

Current status and planes of the staff training of PP issues at Khmelnitsk NPP (Kh NPP)

Presented by Mr Kuchmij, Department Head of PP at Kh NPP

1. Analysis of the current level of preparedness of the PP sub-departments staff
2. Peculiarities of training:
   - PP sub-departments staff
   - internal troops providing security of NPP
   - local troops of the law enforcement agencies
   - local (town, area, region state administrations) staff
   - NPP management
   - Operating personnel
   - Other NPP personnel and subcontracting agencies
3. Basic training

4-5. Advanced trainings

Current status and plans of the staff training of PP issues at Rivne NPP (Rv NPP)

Presented by Mr Kuchmij, Deputy Department Head of PP at Kh NPP

To start the training of the staff on issues of PP onsite at the Training center facility we need to establish the instructors positions of directions:

- Instructor on Unit and central control room operations – 2
- Instructor on PP complex servicing – 2
- Instructor on preparation and conducting of basic instructage of the NPP personnel on PP – 2
- Instructor on documentation development (instructions, provisions, programs, etc) including those on PP issues.

Basing on the Onsite training center (OTC) to develop programs of the bottom and middle level staff training and to send them to the OTC of NPPs.

To improve the proficiency level in a field of the vulnerability assessments of the PP systems as well as their testing

- Development of projects of the PP of NM and nuclear facilities
- Design of technical security means and information protection on PP
- Development of the PP procedures
- Installation and adjustment of security means (SM), testing, vulnerability assessment
- Operation of SM

- o Maintenance of SM
- o PP management in routine conditions and during emergencies

It is also necessary to conduct the advanced training for the internal troops personnel on Npp security to learn more about engineering – technical means as well as experts on information protection, electronic information inclusive

Current status and plans of the staff training of accounting and control of NM issues at Rivne NPP (Rv NPP)

Basic terms and definitions

Clearance to independent work	Permission given to the employee, who has successfully attended training, to independently perform his\her basic job duties (to work at systems and equipment of the NPP, to lead the process, administrative-managerial activity)
Individual training program	Document, being developed basing on the holistic training program, job description and qualification characteristics, defining the training term, its duration and sequence of the training stages, as well as necessary methods and tools, scope of knowledge taking into account personal peculiarities and the basic knowledge of the trainees, job experience , scope of the necessary technical knowledge and process skills
Qualification characteristic	List of basic knowledge, skills and habits of the job performance, defined in the job instructions or in the qualification characteristics of professions basing on the qualifications enquiries
Qualification requirements towards candidates for certain position	Necessity to have basic r professional education required for the nuclear industry , minimum technical knowledge and the employment history, stipulated by the utility company in the holistic training programme before to start getting a new training to hold a new position
Qualification	Level of the NPP staff preparedness , that includes the basic professional education, knowledge, habits and skills as well as the job experience which gives the opportunity to follow stipulated requirements while performing job duties
Onsite training manager	Experienced authorized specialist, appointed by the NPP administration, to train the staff at working place
Knowledge control	Process of the definition of the staff knowledge, that is being trained in a way of oral and written exercises with the marks given for the certain program chapter
Organizational	Joint activity (which has an external

training forms	representation) between the instructor and the instructee. This activity shall follows the stipulated procedure, regulates the correlation between the individual and team training, activeness level of the personnel being trained and the trainers management. The forms of training are as following: Classroom Laboratory Simulator At working place self training
Spent nuclear fuel	Commenced fuel, spent reactor fuel elements or their parts and fuel assemblies of the nuclear reactors at NPPs. Urainum 235 more than 1% enrichment. Spent fuel claddings containing Uranium dioxide elements , plutonium and other Tran uranium elements, Uranium 235 fission products, received when commenced
Exams	Formal process to verify preparedness and professional knowledge availability, skills and habits, that ends with the assessment of the experts readiness to perform professional duties as well as decision making as to the confirmation or changing of the experts professional status
Training	Organized process, aimed to gaining necessary skills , knowledge and habits within the job descriptions requirements according to the training schedule and further knowledge verification
Training schedule	Defines the training organization, structure, recourses, responsibility and qualification of instructors, required to conduct various courses, entry and initial requirements towards trainees and training documentation
Practical training	Integral part of the learning process, that is being organized in real working conditions aimed to gain practical knowledge , form necessary skills and gain the independent work experience
Training program	The methodical document, that stipulates the procedure, sequence and duration of training; defines content and scope of knowledge, skills and habits necessary to gain; controlling procedure, shapes, themes and methods of training
Traineeship	Forms to deepen and broaden of knowledge and habits, gained by trainees in a theory training as well as gaining of practical habits of independent work with current equipment at working place under supervision of the coach, at the available operated power units or equal at the other site

Fresh nuclear fuel	Commenced fuel, spent reactor fuel elements or their parts and fuel assemblies of the nuclear reactors at NPPs. Uranium 235 more than 1% enreachment. Radioactive fission material, alpha-active. Hazardous chemical substances. Fuel containing Uranium dioxide elements in pellets in air-tight metal tubes, assembled to the fuel assemblies
Theoretical training	Part of the training program, that includes gaining of the necessary scope of knowledge from the general educational curricula; knowledge on the concrete equipment , documentation, provisions, rules, regulations, and other regulatory documents, that are in use in the industry
Fuel (nuclear fuel)	Heat generating assemblies for the manageable heat energy generation and transferring in the reactor core

General goals and requirements of personnel training at Rivne NPP

Rivne NPP developed a system of personnel professional training. The training is aimed at raising specialists' professional standards, improving their skills, enabling personnel to act in the new economic environment and, based on all the above mentioned, ensuring highly efficient work and effective employment.

The training of Rivne NPP personnel is continuous in character and is conducted over the whole working period at the Training Centre, at the trade school N12, at sub-units and at appropriate external organizations.

The professional training is based on the methodology of systematic approach, viewing the training as an indissoluble process, which is founded on the analysis of professional activity, development of programmes and training courses, conducting training according to the programmes, monitoring of training and receiving feedback based on the results of monitoring in order to improve the training process.

General requirements to the specialists of Rivne NPP involved in accounting and control of nuclear materials

It is the Nuclear Fuel Department (NFD), consisting of technical and engineering staff, which deals with accounting and control of nuclear materials.
An engineer of the Nuclear Fuel Department belongs to the "specialist" category. He keeps accounting of nuclear fuel (nuclear materials) and prepares documentation on fresh and spent nuclear fuel according to acting

technical and regulatory provisions and requirements of the nuclear fuel producer.

There are qualification categories 1 and 2 envisaged for engineers of Nuclear Fuel Department.
A person with completed higher education in physics-energy field (master's or specialist's degree) can be appointed for a position of an engineer of 2nd category of Nuclear Fuel Department. Advanced training envisaged: for a master – without any requirements to length of service, for a specialist – at least 3 years experience on a position of engineer of 3rd category.

Position of an engineer of the 1st category of Nuclear Fuel Department requires completed higher education in physics- energy (master's /specialist's degree) and experience of work as an engineer of 2nd category not less than 3 years.

The Head of Nuclear Fuel Department belongs to the "manager" category. At Rivne NPP the Deputy Head of Nuclear Physical Laboratory of the Nuclear Safety Department acts as the Head of Nuclear Fuel Department. A person with higher technical education in physics-energy, with experience of technical and administrative management and proved record of work at the NPP on engineering and technical positions not less than 5 years can be appointed for a position of Deputy Head of Nuclear Physics Laboratory .

At Rivne NPP the Head of Nuclear Fuel Department fulfills the duties of Facility Operator, according to the requirements of "regulation on organization of work at Rivne NPP in the area of IAEA safeguards on nuclear materials non-proliferation." N 3 – _-___.

By the order of the General Director the Head of Nuclear Fuel Department is appointed responsible for storing nuclear fuel at Rivne NPP.

The staff of Nuclear Fuel Department of the Nuclear Physics Laboratory is appointed for and relieved of a position by the General Director of Rivne NPP upon introduction of the Head of Department of Nuclear Safety, Resources and Reliability (DNSRR) in accordance with acting labor legislation.

Specialists of Nuclear Fuel Department undergo obligatory medical examination to be admitted to work with ionizing radiation and radioactive materials.

The personnel of Nuclear Fuel Department are regularly certified by the Commission in order to check their qualification. This is done in accordance with the schedule approved by Rivne NPP.

The order of training and admission to independent work

An engineer of NFD is admitted to independent work by the order of General Director after medical examination, training, briefing and check of his knowledge on the following:

- Protection of labor
- Radiation safety regulations
- Fire safety regulations
- ___ and ___ rules;
- Rules of NPP and safety rules, standards and instructions in force in atomic energy;
- regulations on technical operation and on ensuring IAEA safeguards, ToRs;

NFD engineer being appointed for a position for the first time needs to take professional training upon individual program, approved by Chief Engineer of Rivne NPP.

The individual training program identifies topic plan and program of theoretical and practical training. By a special order of the Head of NSD a person responsible for the new employee's training is appointed and a schedule of training and examination drawn.

The terms of training are determined by the Head of Nuclear Safety Department, but it can not be more than 4 months for an engineer of NFD and more than 6 months for the Head of NFD of the Nuclear-Physics Laboratory.

Periodical examination is held once per three years.

Engineer of NFD passes exams to a commission headed by Deputy General Director on safety issues on ___?, ___?, norms and safety regulations in atomic energy and to a commission under the chairmanship of the Head of DNSRR on __, ___, ___, ___.

Examination of Head of NFD is held by the commission under the chairmanship of Deputy General Director on safety issues. In case of inadequate results of examination the administration of Rivne NPP considers the issue of job placement in accordance with acting legislation.

Special examination is held in case of inobservance of rules, as well as in cases, envisaged in "Regulation on work with personnel of National Energy Generating Company ENERGOATOM" 00.00.252.07.00. The extent and terms of special examination are determined by Head of DNSRR or other officials indicated in the «Regulation on work with personnel of National Energy Generating Company ENERGOATOM" 00.00.252.07.00. Persons who have not gone through briefing and have not passed examination are not admitted to independent work.

Organizational Structure of Nuclear Fuel Department at Rivne NPP

Nuclear Fuel Department is a part of Nuclear Physics Laboratory, Department of Nuclear Safety, Resources and Reliability. Head of the NFD acts as Deputy Head of the Nuclear Physics Laboratory.
The composition, number and qualification of NFD personnel are determined by the normative number and staffing, approved by General Director of Rivne NPP.

NFD comprises of 4 persons, such as Head of Fuel Department, engineer of 1st category and two engineers of 2nd category.

Responsibilities of Nuclear Fuel Department

NFD is responsible for:

- Accounting and control of fuel transportation at Rivne NPP.
- Development of programs and schedules of refueling and spent fuel loading;
- Supervising of meeting technical conditions and safety regulations at fresh nuclear fuel storing and handling
- Accounting of fuel resources during operation.
- Control of the fulfillment of requirements of safety regulations at storing spent nuclear fuel.
- Control of actions on receiving, _____ of fresh fuel and loading of spent fuel.
- Ensuring appropriate condition of fresh fuel in the storage (enlisting other departments);
- Filling report forms and keeping accompanying documentation for fuel loaded;
- Preparation and keeping of report documentation according to the system of the State accounting and control of nuclear materials (SSAC), conducting special checks (physical inventories), striking a balance of nuclear materials at Rivne NPP.
- Fulfills the duties of controlling physicists within the requirements of “Regulation on KP”.’
- Organizes IAEA inspections at RNPP within the requirements of “Regulation _ 30-_-___, maintains contacts with SCNR on safeguards issues.
- Fills forms for supply of fresh fuel and loading of spent one.
- Controls the terms of delivery of fresh fuel;
- Provides calculations on accounting of nuclear fuel for book-keeping operations.

The state and prospects of education of specialists on physical protection, accounting and control of nuclear materials in SINEI

K. Gushchin (pro-rector)
Kiriyachenko (Dean of Energy Department)

1. Brief information on SINEI

Sevastopol Institute of Nuclear Energy and Industry (SINEI) was established on the basis of naval and engineering academy by the Decree of Cabinet of Ministers of Ukraine of 2.08.1996 N 884. The above mentioned academy had 40 years experience in educating engineers for operation of autonomous nuclear facilities. The academy used to provide 90% of NPP engineers and 100% of engineers chemists dealing with radioactive materials and their wastes handling for the USSR Navy.

SINEI was established upon the initiative of five NPPs and Goscomatom of Ukraine after their familiarization with existing in the academy system of educating and upbringing of cadets.

At present SINEI is the only institute in Ukraine able to provide comprehensive education of specialists for full nuclear fuel cycle of the atomic energy of Ukraine.

Based on the level of tasks being addressed by the Institute and according to the Decree of the Cabinet of Ministers N 1346 of 29.08.2000 SINEI has been included into a list of enterprises having strategic importance to the economy and safety of the State.

The training system in the Institute is unique. It combines theoretical knowledge, practical training on real equipment and operators' training on simulators. Such system is in complete compliance with IAEA requirements to the systematic approach to training of nuclear facilities personnel.

The Institute provides training of specialists to all departments of the five NPP of Ukraine, enterprises of nuclear fuel cycle (Zirkoniy, Vostgok, UkNipiPromtekhnologiya) and processing enterprises.

The Institute has been given a status of National (Presidential Decree N 305/2002) which is a recognition of its achievements in preparing highly skilled specialists contributing to the development of Ukrainian economy.

The Institute comprises 5 departments:

- Power engineering of NPP; specialities:

- atomic energy
- automated management of technological processes
- computer systems

Electrotechnical Department

- electric power stations
- Electrotechnical systems of power consumption
- Alternative energy
- Metrology and measuring equipment

Department of Nuclear-Chemical Technologies

- Chemical technology of rare dispersed elements and based on them materials

Ecological and technological Department

- Ecology and preservation of environment

Department of pre-institute training (working with school leavers and applicants)

The Institute also has a military department, providing training for officers in reserve for the Ministry of Extraordinary Situations of Ukraine.

Among the teachers of the Institute there are high level professionals, 70% of them having practical experience of nuclear facilities operation.

2. Education of specialists in physical protection, accounting and control of nuclear materials in SINEI

   Implementing the Law of Ukraine “On physical protection of nuclear facilities, nuclear materials, radioactive wastes and other sources of ionizing radiation” in November 2001 the Institute obtained a license of the State Committee for Nuclear Regulation for education, retraining and advanced training of specialists in the area of physical protection of nuclear materials and nuclear facilities.

However, earlier in 1999 the Institute started to teach physical protection of nuclear materials and nuclear facilities (36 hour of training sessions). This subject was supposed to contribute to each specialist’s:

- understanding of crucial importance of fighting with illegal circulation of nuclear materials and combating terrorism

- knowing main international legal requirements and requirements of Ukrainian legislation on given issues
- knowing his role in the system of physical protection of nuclear facility.

At the moment the Institute started implementation of several programmes in the area of physical protection training. They are:

- Training of specialists in physical protection of nuclear materials and facilities (5 years)
- Advanced training of specialists (2 weeks off-site training)

In 2002 SINEI started admission of students on the speciality “Atomic energy”, specialization “Physical protection of nuclear facilities and nuclear materials”.
So specialization “Physical protection of nuclear facilities and nuclear materials” (launched upon permission of the Ministry of Education and Science of Ukraine) is based on the speciality “atomic energy” accredited as 4th level.

From the first till the third year students are taught according to a training plan of atomic energy speciality. Starting from the 4th year the students will be taught according to their specialization program, which is coordinated with the ministry of Education and Science of Ukraine and the Head of Department of physical protection and emergency response of the Ministry of fuel and energy of Ukraine.
The charter below presents disciplines included into the training plan of an engineer on physical protection

Disciplines	Hours
Fundamentals of International Nuclear Energy Law and Nuclear energy legislation	54
Fundamentals of physical protection of nuclear facilities, nuclear materials, radioactive wastes and other sources of ionizing radiation.	108
PP systems design and operation	216
Organization of nuclear materials storing and handling	108
Accounting and control of nuclear materials	162
Engineering and technical provision of PP systems	243
Applied statistics and theory of probability	54
Technical protection of information	54
Security and response forces	81

Outcome: diploma of a specialist/engineer on physical protection of nuclear facilities, nuclear materials and other sources of ionizing radiation.

The training plan also envisages other special disciplines.

The Institute’s will to accomplish a task of educating and retraining specialists in physical protection in Ukraine received real support of IAEA. As

mentioned in the “Proceedings of the joint meeting of representatives of IAEA, the Ministry of fuel and energy of Ukraine and SINEI on the project of cooperation in the area of training specialists in physical protection, control and accounting of nuclear materials” held in May, 14th 2002, “Sevastopol National Institute of Nuclear Energy and Industry is the only institution in Ukraine offering the full program of PP specialists education.
It is mentioned in the report of IAEA mission (June, 4-12, 2001) where it is stressed that such practice is a positive experience in Ukraine and it puts Ukraine on the leading position in the area of physical protection”.
In order to make training process more efficient, the programs should also include practical training on simulators.

At present the following steps aimed at increasing efficiency and quality of specialists training have been determined and coordinated with IAEA:

- Implementation of project on technical cooperation UKR/008 to provide SINEI with modern laboratories on physical protection, accounting and control of nuclear materials
- Cooperation with _Moscow Engineering and Physics Institute (MEFI), having extensive experience of training PP masters (familiarization with laboratory resources of MEFI, methods of running practical sessions, transfer of MEFI training literature to SINEI)
- Training and advanced training of SINEI teachers in the field of physical protection, accounting and control of nuclear materials (MEFI, ____, …San Dia National Laboratories of USA.)

At the moment all the above mentioned disciplines of specialization “Physical protection of nuclear materials and facilities” are supplied with training and methodological literature, received from MEFI within the International Project “Security education at Sevastopol National Institute of Nuclear Energy and Industry” being carried out by joint efforts of SINEI, IAEA and MEFI. Our teachers are working at adjusting training materials to be in conformity with Ukrainian legislation.

Three of the teachers took an advanced training course on PP specialists’ education in MEFI in summer 2003.

Two teachers are studying in MEFI at a two year master’s program on accounting, control and physical protection of nuclear materials.

In the framework of the International Project “Security education at Sevastopol National Institute of Nuclear Energy and Industry” three training laboratories are being established at SINEI. They are:

- Laboratory of physical protection (internal and external detection instrumentation, video-surveillance, systems of access management, etc.)
- Laboratory of accounting and control of nuclear materials (systems of non-destructive control of nuclear materials, bar-code systems, systems of isotope composition detection,

- Computerized classroom with specialized software (estimation of PP systems vulnerability, systems of NM accounting).

3. Institute's problems related to education of specialists in physical protection, accounting and control of nuclear materials

Along with achievements the Institute faces certain problems in this area. Among them:

- Lack of order for such specialists from enterprises of nuclear fuel cycle of Ukraine.
- Lack of world periodicals on given issue.
- Lack of seminars, round tables and conferences on given topic.
- Low pace of constructing and equipping training laboratories
- Lack of system of teachers' retraining in the area of physical protection, accounting and control of nuclear materials.

Basically all events taking place with the assistance of American specialists in Ukraine are focused at training and retraining of specialists working in the field of physical protection, accounting and control of nuclear materials at nuclear facilities of Ukraine. It is only SINEI which is involved in providing education in this area. In this context there is a sharp need for training highly qualified teachers for the Institute. Partially this problem is being solved within the framework of the above mentioned International project, but it is important to explore other opportunities for training and retraining, which can be provided by American specialists.

We hope that this meeting will help us to solve some of the appearing problems.

3. Problems related to training and retraining of specialists working at SINEI in the area of physical protection, accounting and control of nuclear materials.

   At the site of Sevastopol National Institute of Nuclear Energy and Industry there are 3 nuclear facilities:

   - Research reactor __-100
   - Physical stand (critical assembly, situated in the body of biological protection of reactor)
   - Sub-critical uranium-water assembly.

All the facilities are intended to be used for training and scientific purposes, as well as for other works. There are over 20 experimental devices, part of which are unique and are not used anywhere else in Ukraine or CIS.
By the Decree of Cabinet of Ministers of Ukraine N1709 of December 19, 2001 the Institute's facilities, being a training and research complex, have been put on the list of objects belonging to national property of the State.

SINEI also possesses large quantity of sources of ionizing radiation, which are used in a training process. Ensuring of physical protection of facilities

and sources of ionizing radiation, as well as accounting and control of nuclear materials are among main tasks of the Institute as a utility.

In order to ensure physical protection a Department of physical protection and special services has been established in the Institute. This Department is chaired by a pro-rector of the Institute and consists of 4 persons (head of the department and three leading specialists). Accounting and control of nuclear materials is carried out by an account and control engineer, who belongs to the staff of the research reactor.

As there have been some changes in the Department of physical protection and there are new people at places, there is a need for their training and advanced training. We have indicated training needs in the inquirer, which was disseminated prior to this meeting. The matter is that our specialists rarely take part in trainings run in Kiev, as well as international ones. It might be reasonable to extend the content of such courses and to invite SINEI specialists to participate in them. It would also be useful to arrange joint meetings on the issues related to training and advanced training of specialists.

SINEU personnel involved in accounting and control of nuclear materials regularly participates in events, held by George Kuzmich's Centre under the leadership of American specialists and IAEA representatives. We would like to express a request for organization of training on accounting and control of nuclear materials for teachers and instructors.

Similar information on the Institute's training needs has been forwarded to George Kuzmich's Centre prior to this meeting.

Regulatory documents on the accounting and control of NM in use

Low Of Ukraine on use of the nuclear energy and radiation safety (1998) – the fundamental law in the nuclear legislation of Ukraine. It stipulates the priority of peoples and environmental safety, rights and obligations of the citizens in sphere of the nuclear energy use, regulates activity related to the nuclear installations operations.

Agreement between Ukraine and IAEA in safeguards application to all nuclear materials used in entire amicable nuclear industry in Ukraine (1995)- regulates relations between Ukraine and IAEA in the handling and storage sphere of fresh and spent fuel

The following provisions in the sphere of accounting and control of NM are used additionally

_____ 0,03-1,72-87- Fundamental sanitary rules while working with radioactive substances and other sources of the ionized radiation, ___ =72/ 87

__ 306.1.02/1.034-2000 General provisions of the NPPs security insurance

__ 306 .2.08/1.019-99 Rules of physical protection of NM and nuclear facilities

__ 306.4.06.050-2001 Rules of nuclear and radiation safety while transporting radioactive materials, _____-2001

____ _-1-024-90 Rules of nuclear safety of nuclear facilities of nuclear power plants, ___ __ ___-89

____ _-14-029-91 Safety rules of storage and transportation of nuclear fuel on nuclear energy sites

___ 95.745-95 Spent fuel assemblies of the nuclear energy reactors of VVER type, General requirements towards the supply from the regeneration plants

__ 306.4.07.016.-98 Rules on accounting and control of NM at facility

___95.0.01.03.012.-99 IAEA safeguards. Operation of facility. Temporary operator instruction

___3062.07.018-99 Provision on inspection of the system of the accounting and control of NM at facility

RvNPP provisions

1-_-_____ Provision on _____
1-_-___ Provision of nuclear safety department
2-_-___ Provision on controlling physicist RVNPP
3-_-___ Provision or organizing and performance of activities at Rv NPPin sphere of the IAEA safeguards implementation on nuclear materials non-proliferation
3-_-___ Provision on creation of training programs of professional training of personnel

Provisions on quality assurance and instructions

1-04-QA Provision on quality assurance on directing of activity “Nuclear fuel handling”

1-05-QA-02	Quality assurance guidelines while performing the activity related to the radioactive materials transportation
11-_-___	Instruction on accounting and control of nuclear fuel at RvNPP. Units 1,2,3

Current status and plans of the staff training of PP issues at Chernobyl NPP (C NPP)

Represented by Mr Katunin, Deputy director on PP

1. Current status of the staff training of PP issues at CNPP (C NPP)

1.1. Professional training, maintenance and improvement of the proficiency level of the PP staff was organized in accordance with the legislative provisions, rules, regulations and standards on PP of nuclear facilities and NM, sources of ionized radiation and radioactive wastes.

1.2. This activity planning is performed while developing annual schedules working with personnel, containing fundamental directions of the PP staff training.

1.3. The self training and the targeted courses are the main forms of the CNPP PP staff training

1.4. All newly appointed PP staff members have to pass through the entry control of the knowledge level according to the requirements of the regulatory documents

1.5. the individual programs of professional training to hold the new position were developed for all categories of PP experts

1.6. The training (theoretical and practical) of the newly employed staff members is being organized at working place under the management of the experienced experts in PP , who were trained at special courses in the advanced training.
The responsible personnel for the training of the newly employed staff members in PP are controlling the training process and render efficient assistance to the trainees while studying legislative provisions and regulatory-technical documentations on PP. The knowledge verification panel consists of managers and experienced experts in PP.

1.7 The knowledge verification and the permission to the independent work to be obtained by the newly employed personnel to hold the PP expert position are being carried out in terms stated by the individual training programs

1.8 The following events are being planned to maintain the proficiency level of the PP staff at CNPP:

1.8.1 Tactics military drills jointly with the interior troops division # 3041 and the state security service

- Verifying of forces readiness involved into the PP provision at NPP
- To exercise the interactions between the administration, Chief engineer department, PP department, forces and means involved by the state authorities and services to ensure PP of NM and nuclear facility in case if intruders penetration into the NPP
- To detect the vulnerable places, potentially vulnerable for sabotage, nuclear terrorism and blackmail

1.8.2. Participation of experts in PP in designing and conducting of special drills for the interior troops department # 3041. The following issues are being exercised during drills:

- Introduction of regulatory documents, regulatory and operation provisions on PP
- Introduction of the NPP geography, location of the important premises and accesses to them
- Conducting of analysis of the quality of the special events completion while starting the enhancement of the security service at NPP

1.8.3. Self-learning by the PP staff of the legislative and technical-regulatory background on PP issues, special enquiries

1.8.4. Reports of the PP experts on the training results at Kiev Advanced Training Courses

1.8.5. Conducting of tactics training with the PP staff. Attendance of the leading experts trainings, who have been trained at the special courses

1.8.6. Participation in preparation of the emergency preventions training being leaded b the PP experts

1.8.7. Conducting of targeted, planned and out-of-plan PP personnel instructage in case I\of the tactics changing, control over the quality and completion of the information and make it available to all the staff

1.8.8. Conducting of planned and aut-of-plan verifying of the PPs legislation and regulation knowledge with the participation of the of experienced PP experts

1.8.9. Advanced training

Each PP expert at CNPP has been recorded as to the information on the advanced training that the experts has attended

Annually the CNPP prepares the claims to the training center on the delegation of the PP staff to attend the advanced training courses:

- To the Obnisk special interindustrial center. Experience of the technical means of PP operation
- George Kuzmich training center Topic: Fundamental principles of PP
- Courses at the Sevastopol institute: Topic: PP of nuclear facilities, NM, radioactive wastes and other courses of ionized radiation
- Regional IAEA trainings, Chzech republic: Fundamental principles of PP

- Vulnerability assessment courses with the Kiev institute of nuclear researches
- Regional IAEA courses, France: Topic: Operation of the automatic means of the personnel assess (AMPA)

All the staff attended the above mentioned courses were all issued the proper certificates

2. Plans of the PP staff training

The nearest future plans

1. in a course of the 2004-2005 to cover 100% of the PP staff with the special training
   To improve the NPP PP level there is a need to satisfy the NPP necessities in the special PP staff advanced training by the topics:
   - Department management on ensuring PP at nuclear facility and NM – 1 person
   - Administrative and technical management of the AMPA and TTM (technical training means) group – 1 person
   - Administrative and technical management of the AMPA – 1 person
   - AMPA software – 2p
   - Personnel management.– 7p
   - Operation of AMPA-12p
   - Organization of the NM and NF PP. PP design and maintenance – 2p
   - PP design and servicing- 1 p
   - PP servicing- 11p
   - Operational ability analysis of individual TTM- 2p
   - Maintenance of TTM- 1p
   - Personnel management. Prevention of the PP requirements violation and special safety –1 p
   - Prevention of the PP requirements violation and special safety –8 p

2. Jointly with the PP and the training center to training instructors out of the PP staff to train the bottom and middle level personnel on qualification: administration of PP the NM and NF, implementing of automatized systems of PP (assess control, intrusion detection) in case, if the CNPP will get support in the instructors training and receive the basic presentations materials, including devices, stands, well equipped rooms, software. In case of the mentioned conditions ensured, to start proper training of the bottom and middle level experts the CNPP needs 3 years.
3. To start conducting the experience exchange with the CNPP experts to start visiting other nuclear-hazardous facilities to see how the PP service is ensured

Current status and plans of the staff training of accounting and control of NM issues at Chernobyl NPP (C NPP)

Represented by Mr Shatsman, Chief engineer of the units

1. Organizational structure of the NMCA at CNPP
2. Structure of the balance zones at CNPP
3. Specifics of NMCA and IAEA safeguards at CNPP
4. Programs of NMCA
5. NMCA at the shelter facility
6. NMCA in quantity not exceeding 1 efficient Kg
7. Necessity to conduct measurements of NM at facilities

Current status and plans of the staff training of NMCA issues at Kharkiv Physics technical institute

Represented by Mr Odejchuk

1. 10 experts are dealing with the NMCA issues. 8 of them have attended the training at the George Kuzmich Training center and at the others
2. The developed procedures of NMCA are not covering all the spheres of activities completely
3. the non-destructive analysis is performed with use of the gamma-spectrometer and the active counter of the neutrons alignment
4. There is still a need to systematically maintain the proficiency level and the training of the instructors on the following fields:
    - development of the NMCA procedure
    - accounting of NM, safe storage and monitoring
    - NM measurements, non-destructive analysis
    - Information, documentation and reporting on the Safeguards implementation at the facility level
    - NM control at the facility level
    - Computer NMCA
    - Information protection

Plans of the staff training in PP issues at Kharkiv Physics technical institute

Presented by Mr. Mikhail, deputy general director

1. Needs and directions in the PP sphere
2. Roles and place of DOE in the training organizing
3. Recommendations on revisions of the existing regulations in the PP sphere
4. Development of the substantiated recommendations on the alternations implementations into the PP Law and other legislative provisions
5. Forming of the terms and definitions in the PP sphere. What are the MPP?
6. List of information with the limited assess in the PP sphere and its use.

7. The systematic PP staff qualification maintenance is necessary as well as the instructors training on the following directions of activity:
    - design of projects of NF and NM PP ensuring
    - design of the technical security means, information protection, relating the Nm and NF
    - development of the PP procedures
    - installation and adjustment of the engineering-technical security means
    - maintenance and of the engineering-technical security means
    - PP management in normal and emergency conditions

Needs in the staff training, advanced training in PP issues at the Kiev Institute of Nuclear researches

Represented by Mr Lavrinenko

1. Current condition of the Institutes VVER research reactor
2. Difficulties with the ADVANTOR equipment maintenance
3. Needs in the experts training on the maintenance of the engineering –technical part of the PP systems
4. Needs to train interior troops personnel securing the Institutes reactor

Needs in the staff training on NMCA issues at the Kiev Institute of Nuclear researches (KINR)
Represented by Mr Makarovskij

1. Organizing of the NMCA system in the KINR
2. Requirements of the regulatory provisions on training and skills verification of experts in NMCA
3. The requirements towards qualification, training and skills verification available with the KINR
4. Fundamental documents which awareness is necessary for the NMCA experts
5. Current status of the staff training on NMCA issues with KINR
6. There are plans with KINR to move towards training the bottom and middle level staff to be conducted by instructors, trained at the special centers
7. Necessary conditions to move towards the instructors system on NMCA issues (assistance in instructors training, availability of the basic training materials
8. Necessary directions of the qualification maintenance of the NMCA staff

Needs in the staff training on PP issues at NAEK ENERGOATOM, National energy generating company
Represented by Mr Semerey

1. the staff of the NF and NM PP department have attended the following courses on the qualification maintenance and advances training:
   - deputy director of NF and NM PP department – GK training center courses *" Modeling and PP analysis", "Crisis management"*
   - leading engineer NF and NM PP department- regional training courses on PP systems operations, GK training center
   - first category engineer,
   - working meeting *"Fundamental zones definition"* Kozloduy, Bulgaria " NM and NF PP on a base model taking into account increased threat of the international terrorism
2. Taking into account the IAEA safeguards implementation, we are in need to increase qualification level of our staff in following topics:
   - assessments of the developed project of the PP of NF and NM ensuring
   - PP vulnerability assessment
   - Organization and conducting of operational testing of the engineering-technical PP means
3. In a course of 2004 we are ready to ensure the experts of the PP department to attend training in the following issues :
   - development of the project of the NF and NM PP insurance
   - Development of PP procedures
   - Testing and the vulnerability assessment of the PP system
   - PP facility management in routine and emergency conditions

4. Besides of the topics listed below we would like our experts to attend also the following additional courses:
   - Ways and methods to verify forces and means in use of PP system
   - Emergency system modeling to verify forces and means in use of PP system
5. Considering that the George Kuzmich center is not able to organize such amount of courses to cover all the facilities PP staff, we can propose that the center can start conducting the training of the instructors from the most experienced facilities and utility PP personnel that have training skills. They can use skills, methodics to train the staff with regular as well as with advances training. The "fresh" instructors shall obtain proper permissions and licenses
6. as a part of independent training at one of the plants we can establish the training center. Once the decision is approved and financed the issue of the instructions team to serve in center will arise. The staff of the site dealing with the PP issues shall be trained in this center as well as the PP staff serving other facilities.
7. The center shall provide theoretical information as well as to practice practical drills by the power forces to prevent nuclear terrorism actions

Current status and needs in the staff training on NMCA issues at NAEK ENERGOATOM,
National energy generating company

Represented by Mr Abramov, Leading engineer of the fuel handling department

1. 2 experts as well as 2 managers of the NAEK ENERGOATOM are dealing with the NMCA issues. One of them deals with the IAEA safeguards. 2 experts got trained at the George Kuzmich center
2. The departments leads the facility operators activity, how they follow the requirements of the state NMCA system and IAEA safeguards
3. Have developed the experts job descriptions
4. Hot issues still remain to be:
   - development of the NMCA procedures
   - accounting of nuclear materials, data base management
   - NM measurements, non-destructive analysis
   - Information, documentation and reports of safeguards

Needs in the staff training in PP issues at NAEK the State Committee for Nuclear Regulation (SCNR)

Represented by Mr Kunitskij, Deupty Head, PP Department

The following are the major tasks of the SCNR:

1. Development and approval of normative, standards, criterions and requirements of the PP of Nuclear facilities, NM, radioactive wastes, other sources of ionized radiation, that define the conditions of the tasks achievements of the PP, stipulated by the currant legislation.
2. Listening those types of activities, that are PP related of the NF and NM, in accordance with the types of activities approved by the Cabinet of Ministers.
3. State supervision of the legislation, normative, rules, standards, criterions and requirements towards PP and licensing rules being followed; use of compulsory measures towards the legal and physical entities in case of the legislation, normative, rules, standards, criterions and requirements towards PP and licensing rules violation

Taking into consideration all said above the PP Department with the SCNR proposes the following topics of the training courses and workshops, that are of a necessity for the Ukrainian expert to attend:

- Development of projects of the NF and NM PP ensuring
- Design of the technical means of security and information protection
- Development of the PP procedures
- Installation and adjustment of the engineering-technical security means. System testing, vulnerability assessment
- Operation of the engineering-technical security means.
- Maintenance of the engineering-technical security means.
- PP management onsite in routine and emergency conditions
- Inspection of the NMCA
- Inspection of the engineering-technical security means of the NF

- Oversight of the PP of SIR, radioactive wastes
- Licensing issues in sphere of PP of NF, SIR, RW

Needs in the staff training in NMCA issues of the Safeguards Department, Nuclear Weapons Non-Proliferation of the SCNR

Represented by Mr Zadorozhnyj

The Ukrainian experts in NMCA issues have been trained (advanced training) at the various courses and workshops, organized by the donor states. The scope the financing has dropped down recently, that have caused the weakening of the expertise level of the local experts.
The necessity to train the Safeguards department staff has appeared also due to approval of the new " Rules of the NMCA at the nuclear sites " (as of now 200 enterprises were indicated liked those that have got NM available)and due to the recent employment of new staff members, who before were not dealing with the safeguards issues.

That is why the following topics are the order of a day: " NM measurement to meet the State Control Committee (SCC) tasks (the SCC provisions say the metrology equipment characteristics, meant for the NM measurement, can be verify by the Regulatory body experts)" and " The licensing activity in the safeguards implementation, rules and criterions of the regulatory documentation development

The PP Department of the Ministry of Fuels and Energy
(speech abstract)

1. About the role of the body in PP sphere (hereinafter The Body) to form and implement the state policy in the PP sphere of the nuclear-industrial complex.
2. Creation and support of the functioning of the state assessment system of the threats towards NM, NF, SIRs
3. The tasks of the Body to achieve of the PP system tasks on the state and sites levels, including the initiation into force the liability rules
4. On the Body's role to create system of collaboration to prevent attacks on the NF, RW enterprises, transporting means with NM, and other SIRs.
5. Place and objectives of the Body on creation of the uniformed system of the protected communication cannels between the members, participating in the counteractions against nuclear terrorism, NM thefts
6. On the Body's role on creation of the targeted financing system of PP, its control over rational use of finances on sites.
7. On role of industrial control in reliability reinforcement and efficient functioning

The role of the G. Kuzmich center in increasing the NM, PP experts qualification.

Difficulties and future perspectives

Represented by Mr Gavriluk, G.Kuzmich training center (GKTC)

During the time of its existence (October 1998- December 2003) the GKTC has played the definitive role in the increasing the NM, PP Ukrainian experts qualification. All the GKTC activity was carried out within the Nann Lugar program/

The GKTC has gained certain working experience and the presentation materials, as well as has defined the range of the difficulties/ drawbacks, complimenting the training process.

The GKTC is very much in need in the non-destructive analysis experts especially ; in the annual working plans.

The GKTC equipment allows to conduct classes, but the practical exercising demands the specially equipped space.

The GKTC does advocates the systematic training of experts on the directions of their activities.

The future centers attendees – the bottom and middle level experts, instructors to train the bottom level experts onsite.

Appendix B.6. Ukrainian Training Needs Assessment Workshop Protocol

Considered:

1. Information of Ukrainian nuclear fuel cycle enterprises on the structures of subdivisions responsible for physical protection and MC&A.
2. Needs of nuclear fuel cycle enterprises in terms of training for specialists in physical protection and MC&A.
3. Proposal of Sevastopol National Institute of Nuclear Energy and Industry regarding possibility of training instructors in physical protection and MC&A.
4. Methodology for the creation of a multi-level system for training specialists in physical protection and MC&A.
5. Proposals to develop a National Program in physical protection and MC&A consistent with prevailing Ukrainian law.

Noted:

1. Existing need in terms of training specialists in physical protection and MC&A in higher institutions of learning and specialized training centers.
2. Need for state regulation in the training of specialists in physical protection and MC&A in terms of the determination of legal aspects such as the issuance (securing) of teaching licenses and certificates, training methods, and graduation certificates.

Decided:

1. To review the information of the Ukrainian nuclear fuel cycle enterprises on the needs in terms of the training of specialists in physical protection and MC&A.
2. The problem of training specialists in physical protection and MC&A must be take two directions:
2.1. The training of specialists with a basic higher education, at Sevastopol National Institute of Nuclear Energy and Industry, including on a nonresident basis;
2.2. The training of instructors at the Dzh. Kuzmich Training Center and Sevastopol National Institute of Nuclear Energy and Industry, for the purpose of training specialists of the mid-level and elementary components at facilities.

The problem at present has merely been identified and is not supported with regulations, and no sources of funding have been identified.

3. With the assistance of the U.S. Department of Energy:

3.1 Develop for Ukraine a uniform methodology for basic training courses for preparing MPC&A specialists, along the following lines:
- Development of procedures for control and accounting of nuclear material;

- Accounting of nuclear material, safeguarding and surveillance;
- Measurement of nuclear material, nondestructive assay;
- Information, documentation, and reports on the implementation of Assurances at the installation level;
- Control of nuclear material at the installation/facility level;
- Development of designs for ensuring the physical protection of nuclear materials and nuclear installations;
- Design of information-security and -protection systems for protecting nuclear materials and installations;
- Installation and adjustment of security equipment. Testing of physical protection system, and vulnerability assessment.
- Management of physical protection at the state and facility levels in normal and emergency situations.
- Maintenance and repair of security equipment

3.2 Conduct training of nuclear facilities specialists in MC&A in the following areas:

	Area	Number of specialists needed			
		in skill upgrades	in re-training	in initial training	in training instructors
1	Development of MC&A procedures	28	8	9	13
2	Accounting of nuclear material, safeguarding and surveillance	30	8	9	11
3	Measurement of nuclear material, nondestructive assay	31	3	18	12
4	Information, documentation, and reports on the implementation of Assurances at the installation level	27	6	9	11
5	Control of nuclear material at the installation/facility level	22	5	4	10
6	Information protection issues	10	10	10	5
	Total	148	40	59	63

3.3 Conduct survey courses for higher component of administrative–technical personnel and specialists of press services of nuclear power facilities on "State MC&A activities at the State and installation level" and "IAEA Safeguards in Ukraine and at the installation."

3.4 Resolve the problem of deliveries of equipment for the nondestructive assay of NM.

3.5 Continue the practice of training MID officers and units protecting facilities of the nuclear fuel cycle (roughly 200 persons).

3.6 Conduct training of nuclear facilities specialists in physical protection in the following areas:

	Area	Number of specialists needed			
		in skill upgrades	in re-training	in initial training	in training instructors
1	Development of designs for ensuring the physical protection of nuclear materials and nuclear installations	18	11	8	7
2	Design of information-security and -protection systems for protecting nuclear materials and installations	16	6	5	6
3	Development of physical protection procedures	20	15	16	9
4	Installation and adjustment of security equipment. Testing of physical protection system, and vulnerability assessment	23	11	20	10
5	Operation of security equipment. Installation and adjustment of security equipment. Testing of physical protection system,	17	6	24	8

	and vulnerability assessment				
6	Maintenance and repair of security equipment	23	7	21	8
7	Management of physical protection of the facility in routine and emergency situations	21	10	42	7
	Total	138	65	136	55

The number of persons to be trained may increase as a result of requests from nuclear fuel cycle enterprises when new facilities are commissioned (Khmel'nitskiy Nuclear Power Plant 2, Roven Nuclear Power Plant 2, and Spent Nuclear Fuel Storage Facility 2 of Chernobyl Nuclear Power Plant).

3.7 A meeting of physical protection specialists is to be held annually at the D. Kuzmich Training Center.

Working group members:

Beck, D. [signed]
Dickman, D. [signed]
Gavrilyuk, V. I. [signed]
Kunitskiy, I. N. [signed]
Mishchenko, V. V. [signed]
Shatsman, A. V. [signed]
Zadorozhnyy, Yu. V. [signed]
Kiriyachenko, V. A. [signed]
Kuchmiy, Yu. I. [signed]
Gorbachenko, O. V. [signed]
Makarovskiy, V. N. [signed]
Abramov, Yu. A. [signed]
Grabko, V. V. [signed]
Gushchin, K. Yu. [signed]
Titov, S. N. [signed]
Tovkanets, V. Ye. [signed]

Appendix C.1. NIS/Baltics Training Needs Assessment Questionnaire

NEEDS of

_____

nuclear facility name

in training of nuclear materials control, accounting and measurement specialists

1. What laws in your country regulate activities in the field of nuclear energy use?
_____
_____
_____
_____

2. What activities in the field of control and accounting are subject to licensing?
_____
_____
_____
_____
_____

3. Has your country signed Additional Protocol to the Agreement between your country and IAEA?

☐ Yes ☐ No

4. Was the Agreement ratified after the signing?

☐ Yes ☐ No

5. What significant difficulties in finding personnel for strict observance of the Additional Protocol provisions you have to face?
_____
_____
_____
_____
_____

6. Number of specialists working at the site and their training needs

No.	NAME IN FULL	Position and duties	Education, major, when and where graduated from	Advanced training: when and where	Required direction of advanced training

7. Does the site have a procedure according to which specialists in the above-mentioned fields are to go to advanced training periodically, pass qualification exams for the right to occupy a certain position or perform certain type of work:

☐ YES ☐ NO

8. Has your facility developed training programs for lower and middle rank specialists?

☐ YES ☐ NO

9. Does your site need instructors training to teach lower and middle rank specialists?

☐ YES ☐ NO

If YES, fill out the following table:

No.	Instructors specialization	Required number of instructors	Instructors advanced training periodicity (years)
1			
2			
3			
4			
5			
6			
7			
8			

10. De the procedures developed at the facility cover all aspects of activities, associated with nuclear material control and accounting?

☐ YES ☐ NO

11. Does your facility perform non-destructive analysis of nuclear material?

☐ YES ☐ NO

If YES, fill out the table below:

No.	Type of non-destructive analysis	Equipment for analysis	Manufacturer (country)	Main characteristics

				of equipment
1				
2				
3				

12. Do your nuclear material measurement specialists need advanced training?

☐ YES ☐ NO

13. If your facility does not perform non-destructive analysis, are you planning to perform non-destructive analysis in the future?

☐ YES ☐ NO

If YES, do you need to train non-destructive analysis specialists?

☐ YES ☐ NO

What number of specialists, do you think need training?_____

14. Will your facility be able to organize lower and middle rank specialists training in the field on nuclear materials control and accounting, if the facility gets assistance in instructors training and receives teaching and presentation materials?

☐ YES ☐ NO

How much time does the facility need for adequate training on site?

☐ 1 year ☐ years ☐ 3 years

What does the site need for this:

Receive a license ☐

Develop training programs ☐

Train instructors ☐

Purchase required equipment ☐

Prepare proper facilities ☐

Other needs ☐

15. Does your facility need advanced training for specialists in the field of protection of information including information on electronic media?

☐ YES ☐ NO

16. If your site specialists need training, fill out the following table:

No.	Activity	Number of specialists who need			
		advanced training	retraining	initial training	instructor training
1	Development of procedures for nuclear materials control and accounting				
2	Nuclear materials control and accounting				
3	Measurement of nuclear material, non-destructive analysis				
4	Management of nuclear materials control and accounting system				

Signature of nuclear facility official

NEEDS of

_____

nuclear facility name

in training of specialists in the field of physical protection of nuclear material and nuclear facilities.

1. What laws in your country regulate activities in the field of nuclear energy use?

_____
_____
_____
_____
_____

2. What legislation and legal regulations regulate activities in the field of physical protection on nuclear materials and nuclear facilities in your country?

_____
_____
_____
_____
_____
_____

3. What activities in the field of physical protection of nuclear materials and nuclear facilities are subject to licensing?

_____
_____
_____
_____
_____
_____

4. What requirements of the Law and other mandatory legal regulations apply to professional training of persons involved in issues of physical protection of nuclear materials and nuclear facilities?

_____
_____
_____
_____
_____
_____

5. Number of specialists, working at the site and their training needs

No.	NAME IN FULL	Position and duties	Education, major, when and where graduated from	Advanced training: when and where	Required direction of advanced training

6. Does the site have a procedure, pursuant to which physical protection specialists are to go to advanced training periodically, pass qualification exams for the right to occupy a certain position or perform certain type of work:

☐ YES ☐ NO

7. Has your facility developed training programs for lower and middle rank specialists ?

☐ YES ☐ NO

8. Does your site need instructors training to teach lower and middle rank specialists?

☐ YES ☐ NO

If YES, fill out the following table:

No.	Instructors specialization	Required number of instructors	Instructors advanced training periodicity (years)
1			
2			
3			
4			
5			
6			
7			
8			

9. De the procedures developed at the facility cover all aspects of activities, associated with physical protection of nuclear material and nuclear facility?

☐ YES ☐ NO

10. Will your facility be able to organize lower and middle rank specialists training on physical protection of nuclear materials if the facility receives assistance in training of instructors and receives basic training and presentation material?

☐ YES ☐ NO

How much time does the facility need for adequate training on site?

☐ 1 year ☐ 2 years ☐ 3 years

What does the site need for this:

Receive a license ☐

Develop training programs ☐

Train instructors ☐

Purchase required equipment ☐

Prepare proper facilities ☐

Other needs ☐

11. Do the guard force specialists in the field of engineered and technical protection means need advanced training?

☐ YES ☐ NO

12. Does your facility need advanced training for specialists in the field of protection of information including information on electronic media?

☐ YES ☐ NO

13. Do the specialists of your site need advanced training in the field of assessment of vulnerability of physical protection systems and their operational testing?

☐ YES ☐ NO

14. If your site specialists need training, fill out the following table:

No.	Activity	Number of specialists who need			
		advanced training	retraining	initial training	instructor training
1	Design of physical protection system				
2	Commissioning and operation of physical protection systems				
3	Management of physical protection system				

Signature of nuclear facility official

Appendix C.2. NIS/Baltics Training Needs Assessment Facility Visit Reports

Trip reports included are (listing below follows order printed, not visit dates):

- **Kazakhstan (7-11 December 2003)** C.2-2
- **Uzbekistan (11-16 December 2003)**.....C.2-4
- **Lithuania (17-19 December 2003)**.....C.2-5
- **Armenia (25-30 November 2003)**.....C.2-6
- **Belarus (22-23 November 2003)**.....C.2-7

Report
On the Official Trip to the Republic of Kazakhstan of the Delegation from George Kuzmycz Traiing Center:
Victor Gavrilyuk, Head of GKTC and Olena Romanova, Deputy Head of GKTC
7-11 December 2003, Almaty

The purpose of the trip: assessment of training needs of nuclear material control, accounting and physical protection specialists in the Republic of Kazakhstan.

At the meeting, Committee on Nuclear Energy of the Republic of Kazakhstan was represented by: Tengis Masinov, Head of Nuclear Materials Control Department; sergey Chetvergov, Chief Specialist on Illicit Trafficking of Nuclear and Radiation Materials and Physical Protection; Gulnara Eligbayeva, Head of the Nuclear Material Control and Accounting Department; Marat Shaldybayev and Nataliya Ismailova – Chief Specialists of the Committee.

The delegation visited Committee on Nuclear Energy of the Energy and Mineral Resources Ministry of the Republic of Kazakhstan. Kazakhstan side presented its concept of training of representatives from the Republic of Kazakhstan at GKTC.

Committee representatives emphasized the importance of the raised issues for Kazakhstan, stated that the Republic of Kazakhstan has adopted the design threat for nuclear facilities and nuclear materials on the state level and said that Committee needs advanced training to improve skills of the specialists who develop regulations in the field of MPC&A.

At the meeting, another issue that is important for Kazakhstan was discussed – the status of signing and ratification of the Additional Protocol. It was stated that all the preparatory work for signing the Additional Protocol has been nearly completed and that in 2004, the Protocol most probably will be signed and ratified. At the same time, Kazakhstan side underscored the difficulties and issues that Kazakhstan has yet to resolve to provide compliance with the requirements of the Additional Protocol. In particular, they emphasized the importance of training Kazakhstan specialists in the field of nuclear material measurement. Special attention was paid to the nuclear material located beyond nuclear facilities.

In the field of advanced training of physical protection specialists, the following priorities were identified:

- Physical protection systems design;
- Physical protection systems vulnerability assessment, including the transportation of nuclear materials,
- Crisis management.

The importance of training the trainers in all fields of physical protection, control and accounting of nuclear materials was emphasized.

GKTC delegation visited the National Atomic Company Kazatomprom of the Republic of Kazakhstan and held negotiations with Victor Pshenichniy, Deputy Head of Security Administration and Sergey Andronenkov, Head Manager of the Labor and Environment Protection department. Kazatomprom representatives informed that Kazatomprom Corporation includes Ulbinsky Metallurgical Plant and NAEK Kazatomprom.

Kazatomprom representatives emphasized the importance of training at GKTC of physical protection instructors not only for nuclear facilities but also for uranium mining companies. At the same time, they raised the issue of acknowledgment of GKTC certificates in the Republic of Kazakhstan. This issue remained outstanding. Additionally, both the representative of the Committee on Nuclear Energy of the Republic of Kazakhstan, and the representative of Kazatomprom expressed repeatedly their wish for organization of training of Kazakhstan MVD Internal Troops officers who provide security for the nuclear facilities in Kazakhstan and who guard the transportations of nuclear

materials. Also, the need for training of the officers of State Security Committee of the Republic of Kazakhstan dealing with nuclear terrorism was underscored.

During the negotiations with representatives of the Committee of Nuclear Energy of the Republic of Kazakhstan, the names of the participants of the working meeting on training needs assessment for the specialists in the field of physical protection, control and accounting from CIS and Baltic states scheduled for 28-30 January 2004, in GKTC, Kiev, Ukraine. GKTC delegation also provided advice on how to fill out the questionnaires sent in by GKTC in the past. The "Directions of Activities in the Field of Physical Protection, Control and Accounting of Nuclear Materials" and "Proposed Training Topics" provided by GKTC were discussed in great detail.

Kazakhstan representatives assured the GKTC delegation that all the issues raised at the meetings would be discussed with the management of the Committee on Nuclear energy and that finalized proposals on training of MPC&A specialists would be presented by Kazakhstan speakers at the working meeting in January.

Victor Gavrilyuk

Head of GKTC

Olena Romanova

Deputy Head of GKTC

Report
On the Official Trip to the Republic of Uzbekistan of the Delegation from George Kuzmycz Traiing Center:
Victor Gavrilyuk, Head of GKTC and Olena Romanova, Deputy Head of GKTC
11-16 December 2003

The purpose of the trip: assessment of training needs of Uzbekistan regulator (Sanoatkontechnadzor) Agency employees and Uzbekistan nuclear facilities employees.

GKTC delegation offered the regulatory authorities of Uzbekistan a proposed itinerary for GKTC visit in the Republic of Uzbekistan. During the visit, GKTC delegation had a meeting at Sanoatkontechnadzor with H.T.Khalilov, Deputy Head of Nuclear Inspection of Sanoatkontechnadzor Agency. The discussion at the meeting revealed that in addition to one VVR-M research reactor in Uzbekistan there is also one nuclear facility in Tashkent – IIN-3M, owned by Foton Corporation. We also learned that Uzbekistan has not yet developed the regulations and legislation for physical protection of nuclear facilities. Uzbekistan has made obvious progress in the field of nuclear material control and accounting. All nuclear materials have been put under the IAEA safeguards and the Additional Protocol has been signed and ratified. GKTC representatives made a presentation on the Center activities, capabilities and future plans concerning the training of not only Ukrainian specialists but also physical protection, material control and accounting specialists from CIS and Baltic states. Also, GKTC delegation answered questions concerning the filling out the questionnaires in training needs.

GKTC representatives visited Foton Corporation. V.I.Mitin, Head of Radiation Technology and Measurement Department made a presentation for the delegation on the status of nuclear materials control and accounting and on physical protection of the IIN-3M pulse reactor. It is worth saying that physical protection of the reactor needs improvement to be put in compliance with contemporary requirements for physical protection of the nuclear material located at the facility, and nuclear material control and accounting specialists need advanced training to improve their skills.

Management of Sanoatkontechnadzor Agency set up a meeting with Nuclear Physics Institute of the Academy of Science of Uzbekistan at the Institute facility.

The Institute had the following representation at the meeting: U.Salikbayev, Deputy Director, Scientific Research; D.Bulatov, Deputy Director, Security; Karabayev, Chief Engineer of the Reactor; A.Dosimbayev, Deputy Chief Engineer and the Head of Physical Protection department the VVR-M reactor. Institute and reactor management familiarized the GKTC representatives with the situation in the field of nuclear materials control, accounting and physical protection at the Institute. They said that some of the Institute employees involved in physical protection, accounting and control of nuclear materials participated in advanced training courses held by IAEA, in Obninsk, Russia and in GKTC, however they emphasized the necessity for regular advanced training participation. In the opinion of the Regulator and Institute management, training of trainers should be performed for further training of the guard force personnel. Also, physical protection officers of the Institute (Central Security Control Panel operators and technicians providing maintenance of the reactor engineered physical protection systems) need advanced training for skills improvement.

GKTC delegation provided the Uzbekistan side with information and comments on the main activities in the field of physical protection, accounting and control of nuclear materials to be covered by the proposed training courses and communicated the topics of such training courses.

Uzbekistan side emphasized the importance for the country of the training of nuclear material measurement specialists. Also, knowing the situation in the country, Uzbekistan specialists consider emergency response and crisis management training to be high priorities.

Victor Gavrilyuk — Head of GKTC

Olena Romanova — Deputy Head of GKTC

Report
On the Official Trip of the George Kuzmycz Training Center Delegation to Lithuania

George Kuzmycz Training Center delegation consisting of Victor Gavrilyuk and Olena Romanova visited the Republic of Lithuania with the purpose of assessment of training needs of Lithuanian specialists in the field of nuclear materials control and accounting and nuclear materials and nuclear facilities physical protection.

On December 17, GKTC delegation had a meeting with the Head of the State Nuclear Safety Inspection, Saulus Kutas. The meeting was also attended by representatives of Lithuanian law enforcement agencies. GKTC delegation was also presented a speech by Mr. Kutas on the organization of physical protection and nuclear material control and accounting in Lithuania. In Lithuania, nuclear material is held at Ignalina NPP and in Kaunas University (in small quantities). Mr. Kutas underscored that Lithuania signed and ratified the Additional Protocol and provides successful compliance with its requirements.

GKTC delegation presented the Center's concept of training the specialists from CIS and Baltic states to the Lithuanian party and made a presentation covering the Center capabilities in the field of training the MPC&A specialists. It also provided advice on the filling out questionnaires on training needs of Lithuanian specialists. Employees of the Lithuanian regulatory authority improve their qualification regularly at courses and working meetings organized by IAEA both in Lithuania and abroad. Nevertheless, Mr. Kutas emphasized the importance of training of the Lithuanian regulator employees at GKTC.

On December 18, GKTC delegation visited Ignalina NPP. The working meeting participants included: Vitautas Shlaustas, Deputy General Director, Physical Protection; Colonel Vladimiras Schaevas, Commander of Ignalina NPP security detachment; Vitautas Lasis, Head of Staff; Vergilius Lumba, Section Head, Visalinas State Security Department; and other officials. The meeting was also attended by Marius Davainis, deputy Head of the Nuclear Materials Control Department of the State Nuclear Safety Inspection. Center delegation familiarized the Lithuania side with the capabilities of GKTC in the field of training of MPC&A specialists for nuclear materials and nuclear facilities. Lithuanian side emphasized that the most important task of Ignalina NPP is the training of physical protection specialists given the fact that MC&A specialists already had advanced training at various training courses by IAEA including the ones held at GKTC.

Mr. Shlaustas made a perfect presentation on Ignalina NPP physical protection system. It was followed by several presentations by other meeting participants covering the needs of Ignalina NPP for training of its physical protection specialists and MC&A specialists. GKTC representatives were granted an opportunity to tour the nuclear facility (Unit 1) and see some of the elements of Ignalina NPP physical protection system.

On December 19, State Inspection on Nuclear Safety hosted a meeting to summarize some of the results of GKTC activities in Lithuania.

In his presentation, Mr. Kutas emphasized the importance of training of MPC&A specialists from the Lithuanian regulator at GKTC. As far as Ignalina NPP was concerned, it was once again stated that training of physical protection specialists is very important for the Republic of Lithuania. At the same time, they voiced a request for training of NPP guard force (in Lithuania this function is tasked upon border troops due to the fact that the plant is located at the border of Lithuania). Lithuania also has the need for training of specialists in the field of nuclear material measurement.

GKTC representatives asked that Lithuanian participants of the working meeting in January share the experience in implementation of the Additional Protocol requirements. Lithuanian party assured that this request will be satisfied.

Victor Gavrilyuk — Olena Romanova

Head of GKTC — Deputy Head of GKTC

Report

On the Official Trip to Armenia For the Purpose of Training Needs Assessment of Armenian Nuclear Materials and Nuclear Facilities Control, Accounting and Physical Protection Specialists

George Kuzmycz Training Center delegation consisting of Victor Gavrilyuk and Elena Romanova visited the Republic of Armenia on 25-30, November, 2003 with the purpose of assessment of training needs of Armenian specialists in the field of nuclear materials control and accounting and nuclear materials and nuclear facilities physical protection.

Over the time of stay in Armenia, GKTC representatives met with Ashot Martirosian, the Head of Armgosatomnadzor (regulator, GAN), Levon Arutyunian, Armenia GAN State Inspector, Gegan Petrosyan, First Deputy Commander of MVD Internal Troops of Armenia and Head of Staff of Armenia MVD Internal Troops, Ruben Aiginyan, Armenia GAN State Inspector, Amayak Muradyan, Deputy Chief Engineer of Armenian NPP, Musheg Shaginyan, Deputy General Director of Armenian NPP, Physical Protection and with other representatives of nuclear complex of Armenia.

On 29 November 2003, GKTC delegation had a meeting with IPPAS mission (IAEA) visiting in Armenia at that time, namely with Chris Price, Head of IPPAS mission and mission members Arvidas Stadalninas and Vladimir Goltsov.

During the discussion of issues related to advanced training of Armenian specialists in the field of MPC&A, all negotiation participants emphasized utmost interest in training of Armenian specialists. At the same time, it was stated and underscored that such training should be performed in Russian language. Armenian side requested assistance in training of specialists in the field of design threat development and regulations development int eh field of nuclear materials control and accounting and nuclear materials/facilities physical protection. Armenian NPP is looking forward to training of physical protection specialists. At this time the plant is in the process of establishing its Physical protection division.

Priority training directions were determined as follows: procedures development, vulnerability assessment, testing of physical protection systems and crisis management. In the field of nuclear material control and accounting, Armenia has an urgent need in training the specialists who would be able to provide for compliance with the requirements of the Additional Protocol (Armenia has signed the Additional Protocol yet has not ratified it). Special attention is paid to measurement of spent fuel – Armenia has a dry horizontal storage facility for spent fuel.

Representatives of Armenia MVD Internal Troops emphasized the extreme need in training the Armenia MVD Internal Troops officers in charge of NPP security. There is also a need to train the officers of the National Security Service of Armenia.

IPPAS mission participants also emphasized the need for advanced training to improve skills of Armenian specialists in the field of physical protection of nuclear materials.

Our delegation provided the Armenian side with information on GKTC, content of training courses and explanations for filling out the Questionnaire.

Trip resume: Armenian specialists in the field of MPC&A have extreme interest and urgent need for advanced training. Gosatomnadzor of Armenia and Armenian NPP management are very serious about the preparation of the working meeting scheduled for 28-30 January 2004 in Kiev.

Victor Gavrilyuk — Head of GKTC

Elena Romanova — Deputy Head of GKTC

Report
On the Official Trip of the George Kuzmycz Center Delegation to the Republic of Belarus

The delegation of George Kuzmycz Training Center consisting of Victor Gavrilyuk and Elena Romanova visited the the regulatory authority in the field of nuclear safety of Belarus – Promatomnadzor – and the United Institute of Energy and Nuclear Research "SOSNY" of the National Academy of Science of Belarus, on 22-23 November 2003.

On December 22, a working meeting was held in Promatomnadzor of the republic of Belarus between the representatives of the Training Center and Belarus representatives. Belarus side participants of the meeting included: Nikolay Riblevskiy, Head of the Administration for Nuclear and Radiation Safety Control and Regulation, his Deputy Igor Sudakov; Vladimir Sonin, Head of the Department of Nuclear and Radiation Safety Control and Regulation; Vasiliy Polyukovich, Chief State Inspector of Physical Protection, Control and Accounting of Nuclear Materials; and Victor Kushmirov, Chief Expert on Radiation Safety of Promatomnadzor of the Republic of Belarus.

GKTC representatives made a presentation to the Belarus side covering the Center capabilities and the concept of training of MPC&A specialists from CIS and Baltic states in the Center.

Belarus side emphasized its interest to future training at the Center of the specialists from the regulatory authority of Belarus. GKTC delegation provided advice on the fillion out of the training needs questionnaire.

On December 23, GKTC delegation visited the United Institute of Energy and Nuclear Research "SOSNY" of the National Academy of Science of Belarus – the only organization in Belarus managing nuclear facilities and nuclear material.

The working meeting participants included: Alexander Mikhalevich, General Director of the United Institute of Energy and Nuclear Research "SOSNY" of the National Academy of Science of Belarus; Leonid Boiko, Head of the Department of Physical Protection, Nuclear Material Accounting and Control; Alexey Shkodov, Head of Security Procedures and Information Protection Division; Sergey Korneyev, Chief Specialist of MC&A Group; Valeriy Yemelyanov, Head of Physical Protection Section; Yuri Detchik, Chief Engineer of MC&A Group; Gennadiy Vasiliev, Chief Specialist of Physical Protection Section; Vasiliy Polyukovich, Chief State Inspector of Physical Protection, Control and Accounting of Nuclear Materials and other officials of the United Institute. Belarus party made a detailed presentation for the GKTC delegation covering the MPC&A issues of the Institute and emphasizing the existing training needs. Additionally, GKTC representatives were given an opportunity to familiarize with certain elements of the nuclear materials/nuclear facilities physical protection system of the Institute. Belarus side also presented a rather detailed information on the issues of measurement of nuclear materials. United Institute employs highly qualified employees and operates a number of facilities providing nuclear material measurement capabilities.

GKTC representatives made a presentation for the United Institute employees covering the GKTC capabilities in organization of Belarus employees training at the Center.

Belarus side confirmed its extreme interest in training of its MPC&A specialists in Ukraine. Top priority training needs in Belarus include training of physical protection specialists including the officers employed with security guard force.

Victor Gavrilyuk — Head of GKTC

Elena Romanova — Deputy Head of GKTC

Appendix C.3. NIS/Baltics Training Needs Assessment Questionnaire Integrated Report

- **Survey of needs in training of MC&A** C.3-2
  - MC&A training needs summary.....C.3-13
- **Survey of needs in training of physical protection** C.3-14
  - Physical protection training needs summary.....C.3-26

Survey of the training needs of the MCNA experts

1. Laws that regulate the nuclear energy activities

State	Legislative provisions
Latvia	Law on the radiation and nuclear safety
Lithuania	Law on nuclear energy. Provision on MCNA at nuclear and non-nuclear facilities
Azerbaijan	Law on nuclear safety of population. Law on envinroment related safety. Law on the implementation of the provision titled " Agreements of safeguards due to the nuclear weapon non-proliferation agreement and the additional protocol"
Armenia	Law on the peaceful safe use of nuclear energy
Belarus	Law of the radiation safety of population. Agreement on the nuclear weapon non-proliferation. Agreement on IAEA safeguards. Nuclear safety convention. Joint convention on safe handling of the spent fuel and radioactive wastes
Georgia	Law on nuclear and radiation safety
Kazakhstan	Laws: On nuclear energy use. On the natural and man-made emergencies. On licensing. On envinromental safety. On the sanitary-epidemic safety of the population. Provision on exporting and importing of nuclear materials, technologies, equipment, facilities; special non-nuclear materials, equipment, materials and technologies of the dual use; sources of radiation and isotopes production.
Kyrgyzstan	Law on radiation safety of population
Tadgikistan	Law on radiation safety. Law of natural safety
Uzbekistan	Law on radiation safety

2. All kinds of activities in a sphere of MCNA subject to be licensed

Latvia	For use, operation, storage and transportation of the sources of ionized radiation (SIR) and Nuclear Materials (NM)
Lithuania	None
Azerbaijan	The special permissions are to be obtained issued by the proper divisions of Ministry of Health Care and the State technical supervisory body to use the isotopes sources. Export & import, use, transportation, storage of NM and RS
Armenia	Dealing with NM and RM including transportation, use, storage, processing and final disposition of nuclear wastes
Belarus	Use and storage of NM, nuclear facilities operation
Georgia	Storage, accounting, inter-industrial control and use of NM located at the research centers of Georgia
Kazakhstan	All kinds of activity related to MCNA, including training and accreditation of personnel and experts

Kyrgyzstan	U3O8 production, yellow cake
Tadgikistan	Control over radioactive wastes
Uzbekistan	Dealing with SIR

3. Information on the signing of the Additional Protocol (AP) to the Agreement between the seminar attending states and IAEA

Latvia	Yes	
Lithuania	Yes	
Azerbaijan	Yes	
Armenia	Yes	
Belarus		No
Georgia	Yes	
Kazakhstan	Yes	
Kyrgyzstan		No
Tadgikistan	Yes	
Uzbekistan	Yes	

4. Information on the ratification of the Additional Protocol by the seminar attending states

Latvia	Yes	
Lithuania	Yes	
Azerbaijan	Yes	
Armenia		No
Belarus		No
Georgia	Yes	
Kazakhstan		No
Kyrgyzstan		No
Tadgikistan		No
Uzbekistan	Yes	

5. Availability of the significant personnel difficulties to proper implementation of the Additional Protocol provisions

Latvia	To improve the competence level of the customs personnel to control over the AP performance	
Lithuania	No significant ones	
Azerbaijan	Need to retrain the personnel to issue the proper documentation to IAEA	
Armenia	None	
Belarus		

Georgia	Lack of qualified personnel	
Kazakhstan		
Kyrgyzstan		
Tadgikistan	Lack of qualified personnel	
Uzbekistan	To perform the non-destructive analysis	

6. Number of MCNA experts, working at nuclear facilities. In regulatory and managing bodies and their training needs

State	Facility/ enterprise	#	Position level	Education
Latvia	Center for radiation safety	3	Managerial - 3	Higher - 3
Lithuania	Ignalina NPP	8	Engineers – 4 Technicians- 4	Higher technical-6 Higher humanity- 2
Azerbaijan	Institute for radiation issues (gamma-sources complex)	7	Managerial- 3 Researcher – 3 Technician – 1	Higher technical - 7
	Special enterprise “Isotop”	5	Engineers - 5	Higher technical – 4 Higher humanitary – 1
Armenia	Armenian NPP	4	Managerial –3 Engineers - 1	Higher technical – 4
Belarus	“Promatomnadzor”	18	Managerial – 3 Inspectors – 15	Higher technical- 12 Higher humanitary – 6
	Research institute “Sosny”	9	Managerial – 4 Engineers- 2 Researchers - 3	
Kazakhstan	MAEK-KazahAtomProm	2	Managerial – 1 Engineer - 1	Higher technical - 2
Georgia	Research Center	5	Managerial – 2 Researchers – 2 Engineers - 1	Higher technical- 4 Middle technical – 1
Kyrgyzstan	Kara-Bagta enterprise	5	Engineers – 4 Researcher - 1	Higher technical – 5

Tadgikistan	"Vostokkredmet" enterprise	2	Managerial – 2	Higher technical – 2
	Final disposition facility SIR	4	Managerial – 1 Technicians – 3	Higher technical – 2 Middle technical – 2
	Agency for nuclear and radiation safety	2	Engineers - 2	Higher technical – 2
Uzbekistan	Nuclear physics institute	4	4	Higher –4
	"Foton" enterprise	3	3	Higher – 3
	NGMK	3	3	Higher – 3
	RPZPO	2	2	Higher – 2
	Total	86	Managers Engineers Researchers Inspectors technicians	Higher technical Higher humanitary Middle technical

7. Availability of the procedures at the facilities , according to which the staff of the above mentioned types of activities is obliged to periodical advanced training, exams passing to hold certain position of perform certain activity

Latvia	Center for radiation safety	Yes
Lithuania	Ignalina NPP	Yes
Azerbaijan	Institute for radiation issues "Isotope" enterprise	Yes Yes
Armenia	Armenian NPP	Yes
Belarus	Promatomnadzor "Sosny"	Yes Yes
Georgia	Physics institute	-
Kazakhstan	Maek- Kazatomprom	Yes
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	-
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan	Nuclear physics institute	Yes

8. Availability of the training programs at facilities/ enterprises for the middle and bottom level staff.

Latvia	Center for radiation safety	-
Lithuania	Ignalina NPP	Yes
Azerbaijan	Institute for radiation issues	-
	"Isotope" enterprise	-

Armenia	Armenian NPP	Yes
Belarus	Promatomnadzor	Yes
	"Sosny"	Yes
Georgia	Physics institute	-
Kazakhstan	Maek- Kazatomprom	-
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan	Nuclear physics institute	

9. Needs to train instructors at facilities/ enterprises for the middle and bottom level staff training.

Latvia	Center for radiation safety	-
Lithuania	Ignalina NPP	-
Azerbaijan	Institute for radiation issues	Yes
	"Isotope" enterprise	Yes
Armenia	Armenian NPP	-
Belarus	Promatomnadzor	-
	"Sosny"	Yes
Georgia	Physics institute	Yes
Kazakhstan	Maek- Kazatomprom	Yes
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	Yes
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan	Nuclear physics institute	Yes

Special instructors training	# of instructors needed	Frequency of training (times/ year)
Development of MCNA procedures	Azerbaijan –2 Belarus-9 Kazakhstan – 1 Uzbekistan – 2 Kyrgyzstan – 3 Tadgikistan - 3	Azerbaijan – 1/2 Belarus – 1/2 Kazakhstan – 1/1
MCNA	Azerbaijan –3 Georgia – 4 Belarus – 9 Kazakhstan – 1 Uzbekistan – 5 Kyrgyzstan – 3 Tadgikistan - 1	Azerbaijan – 1/2 Georgia – 1/1 Kazakhstan – 2/1 Uzbekistan – 1/2

NM measurement, Non-destructive	Azerbaijan –4 Belarus-10 Georgia – 4 Uzbekistan – 2 Kyrgyzstan – 3 Tadgikistan - 3	Azerbaijan – 1/2 Belarus – 1/2 Uzbekistan – 1/2 Georgia – 1/2
MCNA Management	Azerbaijan –4 Belarus-7 Kazakhstan – 1 Uzbekistan – 2 Kyrgyzstan – 3 Tadgikistan-3	Azerbaijan – 1/2 Kazakhstan – 1/1
Protection against radiation	Belarus - 5	Belarus – 1/2
Dosimetry	Tadgikistan - 2	1/1
Radioanalysis	Tadgikistan - 2	1/1
Protection against radiation and ionized irradiation	Tadgikistan - 2	1/1
Inspection of the radioactive sources users	Tadgikistan - 1	1/1
Envinromental monitoring	Tadgikistan - 1	1/1
Computer processing of accounting data	Georgia - 2	1/1
Total	107	

10. Availability of the comprehensive set of procedures at the facilities/ enterprises, covering all kinds of the MCNA activities.

Latvia	Center for radiation safety	Yes
Lithuania	Ignalina NPP	Yes
Azerbaijan	Institute for radiation issues	Yes
	"Isotope" enterprise	-
Armenia	Armenian NPP	Yes
Belarus	Promatomnadzor	
	"Sosny"	Yes
Georgia	Physics institute	-
Kazakhstan	Maek- Kazatomprom	Yes
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	-
	Final disposition facility	Yes
	AYARB	-
Uzbekistan		Yes

11. Performing of non-destructive analysis of NM at the facilities

Latvia	Center for radiation safety	No
Lithuania	Ignalina NPP	No
Azerbaijan	Institute for radiation issues	No
	"Isotope" enterprise	Yes
Armenia	Armenian NPP	No
Belarus	Promatomnadzor	No
	"Sosny"	Yes
Georgia	Physics institute	No
Kazakhstan	Maek- Kazatomprom	No
Kyrgyzstan	Kara-Bagata enterprise	No
Tadgikistan	"Vostokredmet" enterprise	No
	Final disposition facility	No
	AYARB	No
Uzbekistan	Nuclear physics institute	Yes

Facility	Type of non-destructive analysis (NDA)	Type of equipment for analysis	Manufacturing country	Main features of equipment
"Isotop" enterprise, Azerbaijan	spectrometry	InSpector 2000, alpha, gamma, beta spectrometry, portable spectrometer Microspec	USA, Canbera, Russia, Germany	Spectrometers with scintillac detector NaI and semi-conducting detector (Ge)
"sosny" institute, Belarus	Measurement of uranium enrichment	U-Pu InSpector	USA Canbera	MGAU analysis
	Gamma-spectrometry methods to measure the uranium mass	Gamma spectrometers (cake detectors, Naj detectors)	USA Canbera	20-80% relative efficiency of registration
	Method to count neutron Matching to measure uranium mass	Neutron matching counter	USA Canbera	"Collar" type
Uzbekistan	Definition of enrichment on U -235	PMC Inspector	USA Canbera	NaI detector, Outdated software

12. Needs at facilities/ enterprises in the advanced training for NM measurement

Latvia	Center for radiation safety	-
Lithuania	Ignalina NPP	-
Azerbaijan	Institute for radiation issues	Yes
	"Isotope" enterprise	Yes
Armenia	Armenian NPP	Yes
Belarus	Promatomnadzor	Yes
	"Sosny"	Yes
Georgia	Physics institute	Yes
Kazakhstan	Maek- Kazatomprom	Yes
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	Yes
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan		Yes

13. Needs to conduct the non-destructive analysis (NDA) at facilities.

Latvia	Center for radiation safety	-
Lithuania	Ignalina NPP	-
Azerbaijan	Institute for radiation issues	Yes
	"Isotope" enterprise	Yes
Armenia	Armenian NPP	Yes
Belarus	Promatomnadzor	Yes
	"Sosny"	-
Georgia	Physics institute	Yes
Kazakhstan	Maek- Kazatomprom	Yes
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	Yes
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan		Yes

Needs to train experts in NDA.

Latvia	Center for radiation safety	-
Lithuania	Ignalina NPP	-
Azerbaijan	Institute for radiation issues	Yes
	"Isotope" enterprise	Yes
Armenia	Armenian NPP	Yes
Belarus	Promatomnadzor	Yes
	"Sosny"	Yes
Georgia	Physics institute	Yes

Kazakhstan	Maek- Kazatomprom	Yes
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	Yes
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan		Yes

Number of experts to be trained

Latvia	Center for radiation safety	-
Lithuania	Ignalina NPP	-
Azerbaijan	Institute for radiation issues	5
	"Isotope" enterprise	4
Armenia	Armenian NPP	3
Belarus	Promatomnadzor	5-7
	"Sosny"	5
Georgia	Physics institute	4
Kazakhstan	Maek- Kazatomprom	3
Kyrgyzstan	Kara-Bagata enterprise	2-3
Tadgikistan	"Vostokredmet" enterprise	2
	Final disposition facility	1
	AYARB	3
Uzbekistan		3
Total		43

14. Chance for the states to train the middle and bottom level staff in MCNA, if the facility will be supported with instructors training as well as with the necessary training and presentation materials

Latvia	Center for radiation safety	-
Lithuania	Ignalina NPP	-
Azerbaijan	Institute for radiation issues	Yes
	"Isotope" enterprise	Yes
Armenia	Armenian NPP	Yes
Belarus	Promatomnadzor	-
	"Sosny"	Yes
Georgia	Physics institute	Yes
Kazakhstan	Maek- Kazatomprom	Yes
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	Yes
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan		Yes

Time needed for the states to organize the proper training onsite

State	1 year	2 years
Azerbaijan	+	
Armenia		+
Belarus	+	
Georgia		+
Kazakhstan	+	
Kyrgyzstan	+	
Tadgikistan		+
Uzbekistan		+

The following is needed for the sites to organize proper training

	Azerbaijan	Armenia	Belarus	Georgia	Kazakhstan	Uzbekistan	Kyrgyzstan	tadjikistan
To develop training programs	+	+	+	+	+	+	+	+
To train instructors	+	+	+	+	+	+	+	+
To purchase equipment needed	+	+	+	+	+	+	+	+
To prepare proper premises	+	+	+	+	-	+	+	+
To obtain license	-	+	+	+	+	-	+	-

15. Need for states (facilities/ enterprises)to receive assistance for the experts in advanced training to protect information including info on electronic carriers

Latvia		-
Lithuania		Yes
Azerbaijan	Institute for radiation issues	Yes
	"Isotope" enterprise	Yes
Armenia	Armenian NPP	Yes
Belarus	Promatomnadzor	Yes
	"Sosny"	Yes
Georgia	Physics institute	Yes
Kazakhstan	Maek- Kazatomprom	Yes
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	-
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan		Yes

16. Training needs in the following fields of activities

No	Activity	Number of specialists who need			
		Advanced training	Retraining	Initial training	Instructor training
1	Development of procedures for nuclear materials control and accounting	Lithuania –3 Azerbaijan – 2 Armenia – 1 Belarus – 5 Kazakhstan – 1 Uzbekistan – 1 Kyrgyzstan-2	Azerbaijan- 2 Armenia – 1 Belarus – 2 Uzbekistan – 3 Tadgikistan- 1	Azerbaijan- 2 Belarus- 10 Georgia – 2 Uzbekistan – 2 Tadgikistan - 2	Azerbaijan – 2 Belarus – 9 Kazakhstan- 1 Uzbekistan- 2 Kyrgyzstan – 3 Tadgikistan –3
2	Nuclear materials control and accounting	Latvia - 3 Lithuania –8 Azerbaijan – 2 Armenia – 1 Belarus – 5 Kazakhstan – 2 Uzbekistan – 1 Kyrgyzstan-2	Azerbaijan- 2 Armenia – 1 Belarus – 2 Georgia – 3 Uzbekistan – 3	Azerbaijan- 3 Belarus- 10 Uzbekistan – 3 Tadgikistan - 4	Azerbaijan – 3 Belarus- 9 Georgia – 4 Kazakhstan – 1 Uzbekistan – 5 Kyrgyzstan-3 Tadgikistan –3
3	Measurement of nuclear material, non-destructive analysis	Belarus – 5 Kazakhstan – 1 Uzbekistan – 1 Kyrgyzstan-2	Azerbaijan- 4 Belarus – 5 Uzbekistan – 2	Azerbaijan- 5 Armenia – 2 Belarus – 10 Georgia – 2 Uzbekistan – 2 Tadgikistan –5	Azerbaijan – 4 Belarus- 10 Georgia – 4 Uzbekistan – 2 Kyrgyzstan-3 Tadgikistan –3
4	Management of nuclear materials control and accounting system	Latvia - 3 Armenia – 1 Belarus – 2 Kazakhstan – 1 Uzbekistan – 2 Kyrgyzstan-2	Armenia – 1 Belarus – 2 Uzbekistan – 1	Azerbaijan- 4 Belarus – 7 Georgia – 2 Kazakhstan – 1 Uzbekistan – 1 Tadgikistan –3	Azerbaijan – 4 Belarus- 7 Uzbekistan – 2 Kazakhstan – 1 Kyrgyzstan-3 Tadgikistan –3

SUMMARY SURVEY ON IDENTIFYING THE NEEDS FOR TRAINING OF SPECIALISTS IN THE FIELD OF NUCLEAR MATERIAL CONTROL AND ACCOUNTING

10 countries: Latvia, Lithuania, Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan participated in an inquiry conducted by GKTC on identifying the needs for training of specialists who work in the field of material protection, control and accounting. The operating nuclear power plants are only in Lithuania and Armenia, another nuclear facilities operate also in Belarus (critical assembly), Georgia (subcritical assembly), Kazakhstan (research reactors), Uzbekistan (research reactor and pulsed reactor). In a number countries nuclear reactors were but now they are shut down (Belarus, Georgia, Latvia, Kazakhstan). Besides, there is a homogeneous reactor in Tajikistan that wasn't put into operation. Several countries have problems concerning extraction of uranium ore (Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan). This is a cause to include into questionnaire the needs of several countries to train specialists in the field of radiation safety and handling of SIR.

Not all countries have legislative base that regulates nuclear activity. Perhaps this situation is connected with the absence of such base in these countries. At the same time almost all countries except Belarus and Kyrgyzstan have signed Additional Protocol (AP). Latvia, Lithuania, Azerbaijan, Georgia, and Uzbekistan have ratified this AP. In connection with signature of AP the main problem is lack of qualified staff, that's why a question of training of specialists in the field of control and accounting of nuclear material puts sharply.

The main directions of activity on which training is necessary and number of specialists who need to be trained are following:

№	Direction of activity	Number of specialists who need			
		advanced training	retraining	basic training	instructor training
1	Development of procedures of control and accounting of nuclear material	15	9	18	20
2	Accounting of nuclear material, storage and survey	24	11	20	28
3	Measurement of nuclear material, nondestructive analysis	9	11	26	26
4	Management of system of control and accounting of nuclear material	11	4	18	20
	Total	**59**	**35**	**82**	**94**

Almost all sites/organizations of countries have procedures according to which staff has to up-grade qualification regularly.

Training needs analysis shows that all nuclear sites and organizations need basic training and advanced training of management and engineer staff.

All countries except Latvia, Lithuania, and Armenia ask to train site instructors for specialists training of lower and middle ranks. In addition to instructors training in the field of MC&A several countries need instructors training in the field of handling of radioactive materials.

Special emphasis on a future training of specialists places on a nondestructive analysis of NM. Nondestructive analysis of NM is carried out in Azerbaijan (Special Industrial Complex "Izotop"), in Belarus (the Joint Institute for Power and Nuclear Research "Sosny"), and in Uzbekistan (Institute of Nuclear Physics) only. All countries except Latvia and Lithuania confirmed specialists training needs on a nondestructive analysis of NM. There is necessary to train 43 specialists.

Survey of the training needs of the experts in physical protection of NM and nuclear facilities (NF)

1. laws that regulate the nuclear energy activities

State	Legislative provisions
Latvia	Law on the radiation and nuclear safety
Lithuania	Law on nuclear energy.
Azerbaijan	Law on nuclear safety of population. Law on envinromental safety. Law on the implementation of the provision titled " Agreements of safeguards due to the nuclear weapon non-proliferation agreement and the additional protocol"
Armenia	Law on the peaceful safe use of nuclear energy
Belarus	Law of the radiation safety of population. Agreement on the nuclear weapon non-proliferation. Agreement on IAEA safeguards. Nuclear safety convention. Joint convention on safe handling of the spent fuel and radioactive wastes
Georgia	Law on nuclear and radiation safety
Kazakhstan	Laws: On nuclear energy use. On the natural and man-made emergencies. On licensing. On envinromental safety. On the sanitary-epidemic safety of the population. Provision on exporting and importing of nuclear materials, technologies, equipment, facilities; special non-nuclear materials, equipment, materials and technologies of the dual use; sources of radiation and isotopes production.
Kyrgyzstan	Law on radiation safety of population
Tadgikistan	Law on radiation safety.
Uzbekistan	Law on radiation safety

2. Legislative provisions on the PP of NM and NF

Latvia	Provision of Cabinet of Ministers " Requirements for PP of the SIRs"
Lithuania	Provision on Ignalina NPP, Provision on PP of Nuclear Facilities
Azerbaijan	Normative on radiation safety NRB 76/87 (USSR), NRB 99 (Russian Federation), SPORO-85, BSS – 115 (IAEA)
Armenia	Concepts of enhancement of PP and security of the Armenian NPP and NM. Rules of PP of NM and NM storage facilities
Belarus	Provision on PP of NM, their use, storage and transportation. Convention on PP of NM INFCIRC/ 274/ Rev/ 1 Add 5. PP of NM and NF INFCIRC/225/ Rev/4. Joint convention on spent fuel and radioactive wastes handling (INFCIRC/ 546)
Georgia	Rules on the hazardous cargoes transportation. Convention of PP of NM

Kazakhstan	"Provision on PP of NM and NF" , "Standard contain of provision to provide measures on PP of NM and NF", "Standard meaning of PP of Nm and NF and general requirements towards information available", "Standard contain of the response plan in emergencies", " Methodic of typical threats definition", "Rules to perform targeted inspections of PP of NM and NF, NM locations", " requirements towards designing and operation of PP systems of NM and NF"
Kyrgyzstan	-
Tadgikistan	-
Uzbekistan	-

3. All kinds of activities in a sphere of PP subject to be licensed

Latvia	For use, operation, storage and transportation of the sources of ionized radiation (SIR) and Nuclear Materials (NM)
Lithuania	All kinds of activity at NF. None (INPP and VATESI)
Azerbaijan	None within the Armenian National Academy of Sciences. Design, construction of premises for NF, transportation, storage of NM and NF ("Isotop" enterprise)
Armenia	None
Belarus	Use and storage of NM, nuclear facilities operation. The operator is obliged to guarantee all PP measures, that are subject be verified by the expert before the license is issued and during the inspection process. Security license.
Georgia	Storage and transportation of NM, operation of the subcritical stand PC-1 of Physics institute with the Georgian Academy of Sciences
Kazakhstan	All kinds of activity related to PP of Nm and NF
Kyrgyzstan	None
Tadgikistan	All kind of activity to use radioactive substances
Uzbekistan	All kind of activities to provide PP of NF, NM and SIR

4. Number of experts, working at nuclear facilities and in regulatory and managing bodies and their training needs

State	Facility/ enterprise	#	Position level	Education
Latvia	Center for radiation safety	5	Managerial - 5	-
Lithuania	Ignalina NPP PP Security Dept.	22	Managers – 6 Engineers – 9 Technicians- 1 Inspectors – 6	Higher technical-9 Higher humanitary- 9 Secondary technical – 8 Secondary humanitary – 3

	Guards	26	Managers – 5 Experts – 21	Higher technical – 7 Higher humanitary – 8 Secondary technical – 8 Secondary humanitary - 3
	State security department	5	Managers – 5	All higher
	VATESI	3	Managers – 1 Inspectors - 2	Higher technical - 3
Azerbaijan	Institute for radiation issues (gamma-sources complex)	7	Managerial- 2 Researcher – 1 Technician – 1 Engineers - 3	Higher technical-6 Secondary - 1
	Special enterprise "Isotop"	3	Engineers - 3	Higher technical - 2 Higher humanity – 1
Armenia	Armenian NPP	35	Managerial –4 Engineers – 3 Other teams not built so far	Higher technical – 7
Belarus	"Promatomnadzor"	19	Managerial – 4 Inspectors – 15	Higher technical – 12 Higher humanitary – 6
	Research institute "Sosny"	7	Managerial – 4 Experts- 3	Higher technical – 5 Higher humanitary - 2
Kazakhstan	MAEK-KazahAtomProm	19	Managerial – 8 Engineers– 11	Higher technical – 13 Higher humanitary – 6
	UMZ enterprise	6	Managers – 3 Engineers - 3	Higher - 6
Georgia	Research Center	9	Managerial – 6 Researchers – 3	Higher technical- 9
Kyrgyzstan	Kara-Bagta enterprise	5	managers – 3 Engineers - 2	Higher technical – 3 Higher humanitary - 2
Tadgikistan	"Vostokkredmet" enterprise	2	Managerial – 2	Higher technical – 2
	Final disposition facility SIR	4	Managerial – 1 Technicians – 3	Higher technical – 2 Middle technical – 2

	Agency for nuclear and radiation safety	2	Engineers - 2	Higher technical – 2
Uzbekistan	Nuclear physics institute	6		Higher –4
	"Foton" enterprise	3		Higher – 3
	NGMK	2		Higher – 3
	RPZPO	2		Higher – 2
10 states	Total	192	Managers Engineers Researchers Inspectors technicians	Higher technical Higher humanitary Secondary technical

5. Availability of the procedures at the facilities , according to which the staff of the above mentioned types of activities is obliged to periodical advanced training, exams passing to hold certain position of perform certain activity

Latvia	Center for radiation safety	No
Lithuania	Ignalina NPP	Yes
	VATESI	No
Azerbaijan	Institute for radiation issues	Yes
	"Isotope" enterprise	Yes
Armenia	Armenian NPP	No
Belarus	Promatomnadzor	
	"Sosny"	No
Georgia	Physics institute	No
Kazakhstan	Maek- Kazatomprom	Yes
	UMZ enterprise	Yes
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	No
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan	Physics institute, Foton, NGMK, RPZRO	Yes

6. Availability of the training programs at facilities/ enterprises for the middle and bottom level staff.

Latvia	Center for radiation safety	No
Lithuania	Ignalina NPP	Yes
	VATESI	No
Azerbaijan	Institute for radiation issues	No
	"Isotope" enterprise	No
Armenia	Armenian NPP	No
Belarus	Promatomnadzor	No
	"Sosny"	Yes

Georgia	Physics institute	No
Kazakhstan	Maek- Kazatomprom	Yes
	UMZ enterprise	-
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	No
	Final disposition facility	No
	AYARB	No
Uzbekistan	Physics institute, Foton, NGMK, RPZRO	No

7. Needs at facilities/ enterprises to train instructors for the middle and bottom level staff training.

Latvia	Center for radiation safety	-
Lithuania	Ignalina NPP	Yes
	VATESI	Yes
Azerbaijan	Institute for radiation issues	Yes
	"Isotope" enterprise	Yes
Armenia	Armenian NPP	Yes
Belarus	Promatomnadzor	-
	"Sosny"	Yes
Georgia	Physics institute	Yes
Kazakhstan	Maek- Kazatomprom	Yes
	UMZ enterprise	Yes
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	Yes
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan	Physics institute, Foton, NGMK, RPZRO	Yes

8. Number of instructors needed and what activity

State	Facility	Instructor's Type of activity	# of instructors needed	Frequency of advanced training for instructors, years
Lithuania	Ignalina NPP	PP system design	3	3-5
		Turning into operation and operation of PP system	3	2-3
		PP management	4	2-3
		Crisis management & crisis negotiating	+	
	VATESI	Basics of PP	1	3-5

Azerbaijan	Radiation issues institute	PP system design	2	1
		Turning into operation and operation of PP system	2	1
		PP management	2	1
	"Isotop" enterprise	PP system design	1	1
		Turning into operation and operation of PP system	1	1
		PP management	1	1
Armenia	NPP	PP system design	2	3
		Turning into operation and operation of PP system	3	3
		PP management	2	3
Belarus	Nuclear research institute "Sosny"	To train the alarm station operators	1	2
		Update of the threat assessment information	1	1
		General issues	1	2
		Methods to calculate the PP features	1	2
		Design of PP system	2	2
		Turning into operation and operation of PP system	1	2
Georgia	Physics institute	Location of NM and wastes while attempting to transport them illegally	10	1
		Electronic alarm installation at NM storage areas	3	1
		Dosimetry control at NM storage sites	8	1
		Identification of fission products and level of their enrichment	4	1
Kazakhstan	MAEk-Kazahatomprom	PP system design	1	2
		Turning into operation and operation of PP system	3	2
		PP management	1	2
	UMZ Enterprise	PP system design	1	2
		Turning into operation and operation of PP system	2	2
		PP management	1	2
Kyrzyzstan		PP system design	3	1
		Turning into operation and operation of PP system	3	1
		PP management	3	1
Tadgikistan	Vostokredmet	Dosimetry	2	1
		Radioanalysis	2	1

	Final disposition of radioactive wastes	Radioactive wastes processing	1	1
		Radiation safety	1	1
		PP system design	1	1
		Turning into operation and operation of PP system	1	1
		PP management	1	1
	AYARB	PP system design	1	1
		Turning into operation and operation of PP system	1	1
		PP management	1	1
		Pp of NM	1	1
		Protection against radiation and SIR	1	1
		Inspection of the SIRs operators	1	1
Uzbekistan		Design and management of PP system	3	1
		Maintenance	2	1
		Software	2	1
		Inspection of PP system	2	1
	Total		101	

9, Availability of the comprehensive set of procedures at the facilities/ enterprises, covering all kinds of NM PP system.

Latvia	Center for radiation safety	Yes
Lithuania	Ignalina NPP	Yes
	VATESI	Yes
Azerbaijan	Institute for radiation issues	No
	“Isotope” enterprise	Yes
Armenia	Armenian NPP	No
Belarus	Promatomnadzor	No
	“Sosny”	Yes
Georgia	Physics institute	No
Kazakhstan	Maek- Kazatomprom	Yes
	UMZ Enterprise	Yes
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	“Vostokredmet” enterprise	Yes
	Final disposition facility	No
	AYARB	No
Uzbekistan	Physics institute, Foton, NGMK, RPZRO	Yes

10. Chance for the states to train the middle and bottom level staff in MCNA, if the facility will be supported with instructors training as well as with the necessary training and presentation materials

Latvia	Center for radiation safety	Yes
Lithuania	Ignalina NPP	Yes
	VATESI	-
Azerbaijan	Institute for radiation issues	Yes
	"Isotope" enterprise	Yes
Armenia	Armenian NPP	Yes
Belarus	Promatomnadzor	No
	"Sosny"	Yes
Georgia	Physics institute	Yes
Kazakhstan	Maek- Kazatomprom	Yes
	UMZ Enterprise	Yes
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	Yes
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan	Physics institute, Foton, NGMK, RPZRO	Yes

Time needed for the states to organize the proper training onsite

State	facility	1 year	2 years	3 years
Latvia	Center for radiation related safety	+		
Lithuania	Ignalina NPP	+		
	VATESI	-	-	-
Azerbaijan	Radiation issues institute	+		
	Isotop enterprise		+	
Armenia	ANPP		+	
Belarus	Promatomnadzor	-	-	-
	Sosny institute	+		
Georgia	Physics institute		+	
Kazakhstan	MAEK-Kazatomprom	+		
	UMZ enterprise	+		
Kyrgyzstan	Kara-Bagta enterprise	+		
Tadgikistan	Vostorredmet enterprise	+		
	Final disposition			

	facility AYARB		+	+
Uzbekistan	Physics institute, Foton, NGMK, RPZRO		+	

The following is needed for the sites to organize proper training

	Latvia	Lithuania	Azerbaijan	Armenia	Belarus	Georgia	Kazakhstan	Uzbekistan	Kyrgyzstan	tadjikistan
To develop training programs	+	+	+	+	+	+	+	+	+	+
To train instructors	+	+	+	+	+	+	+	+	+	+
To purchase equipment needed	+	+	+	+	+	+	+	+	+	+
To prepare proper premises		+	+	+	+	+		+		+
To obtain license				+		+		+		+

11. Need for the security teams members to improve the qualification level in use of engineering –technical means

Latvia	CRS	Yes
Lithuania	Ignalina NPP	Yes
	VATESI	-
Azerbaijan	Institute for radiation issues	Yes
	“Isotope” enterprise	Yes
Armenia	Armenian NPP	Yes
Belarus	Promatomnadzor	-
	“Sosny”	Yes
Georgia	Physics institute	Yes
Kazakhstan	Maek- Kazatomprom	Yes
	UMZ enterprise	Yes
Kyrgyzstan	Kara-Bagata enterprise	Yes

Tadgikistan	"Vostokredmet" enterprise	No
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan	Nuclear physics institute, Foton, NGMK, RPZRO	Yes

12.Need for states (facilities/ enterprises)to receive assistance for the experts in advanced training to protect information including info on electronic carriers

Latvia	CRS	No
Lithuania	Ignalina NPP	No
	VATESI	-
Azerbaijan	Institute for radiation issues	Yes
	"Isotope" enterprise	Yes
Armenia	Armenian NPP	Yes
Belarus	Promatomnadzor	Yes
	"Sosny"	Yes
Georgia	Physics institute	Yes
Kazakhstan	Maek- Kazatomprom	Yes
	UNZ enterprise	-
Kyrgyzstan	Kara-Bagata enterprise	Yes
Tadgikistan	"Vostokredmet" enterprise	No
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan	Nuclear physics institute, Foton, NGMK, RPZRO	Yes

13. Need for advanced training for the PP threats and operational testing assessment experts

Latvia	CRS	No
Lithuania	Ignalina NPP	Yes
	VATESI	-
Azerbaijan	Institute for radiation issues	Yes
	"Isotope" enterprise	Yes
Armenia	Armenian NPP	Yes
Belarus	Promatomnadzor	Yes
	"Sosny"	Yes
Georgia	Physics institute	Yes
Kazakhstan	Maek- Kazatomprom	Yes
	UNZ enterprise	-
Kyrgyzstan	Kara-Bagata enterprise	Yes

Tadgikistan	"Vostokredmet" enterprise	No
	Final disposition facility	Yes
	AYARB	Yes
Uzbekistan	Nuclear physics institute, Foton, NGMK, RPZRO	Yes

14. Main topics the facility/ enterprises experts need to get training in:

State	Topic of courses	Advanced training	retraining	Basic training	Instructors training
Latvia	PP system design	-			
	Turning into operation & operation	5			
	PP system management	5			
Lithuania NPP	PP system design	6			3
	Turning into operation & operation	6			3
	PP system management	29			4
Lithuania VATESI	Basics of PP				1
	Methodic of assessment and designing of design threat	2-3			
	PP system design	2-3			
	Basic modeling of PP	2-3			
	Introduction to vulnerability assessment of PP system	2-3			
	Definition of vital areas	2-3			
	Turning into operational safety	2-3			
Azerbaijan	PP system design			3	3
	Turning into operation & operation		1	3	3
	PP system management	1	1	2	3
Armenia	PP system design	3	3	-	2
	Turning into operation & operation	5	3	3	3
	PP system management	3	3	-	2
Belarus	PP system design	6		7	2
	Turning into operation & operation	6		12	1
	PP system management	5			
	Alarm station operators training				1
	Information update of threats assessment				1
	PP basic issues				1
	Calculation methods of the PP features				1
Georgia	PP system design			2	
	Turning into operation & operation		2		
	PP system management			2	

	Detection of NM in case of illegal transportation Electronic alarm equipment at the NM storage facilities Dosimetry control in NM storage areas Identification of fission products And enrichment level				10 3 8 4
Kazakhstan	PP system design	6			2
	Turning into operation & operation	19		16	5
	PP system management	6		4	2
	Information protection	1			
Kyrgyzstan	PP system design	2			3
	Turning into operation & operation	2			3
	PP system management	2			3
Tadgikistan	PP system design			2	2
	Turning into operation & operation			4	2
	PP system management			2	2
	Dosimeter				2
	Radioanalysis				2
	Processing of radioactive wastes				1
	Radiation safety				1
	PP of NM				1
	Protection against SIR and radiation				1
	Inspection of radiation sources operators				1
Uzbekistan	PP system design	4	2	3	4
	Turning into operation & operation	2	2	4	4
	PP system management	3	2	4	4
	Maintenance				2
	Software				2
	Inspection of PP				2
Total		145	21	73	110

SUMMARY SURVEY ON IDENTIFYING THE NEEDS FOR TRAINING OF SPECIALISTS IN THE FIELD OF NUCLEAR MATERIAL PHYSICAL PROTECTION

10 countries: Latvia, Lithuania, Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan participated in an inquiry conducted by GKTC on identifying the needs for training of specialists who work in the field of material protection, control and accounting. The operating nuclear power plants are only in Lithuania and Armenia, another nuclear facilities operate also in Belarus (critical assembly), Georgia (subcritical assembly), Kazakhstan (research reactors), Uzbekistan (research reactor and pulsed reactor). In a number countries nuclear reactors were but now they are shut down (Belarus, Georgia, Latvia, Kazakhstan). Besides, there is a homogeneous reactor in Tajikistan that wasn't put into operation. Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan have uranium mine and ore processing plants. Not all countries have the developed regulatory legislative sphere that determines activity in the field of Physical Protection, Control and Accounting of Nuclear Material and Nuclear Facilities. It is lacking in Kyrgyzstan, Tajikistan, and Uzbekistan. Almost in all countries an activity on PP is not licensed separately. It is constituent part of licenses issued on all types of activity at nuclear sites.

All member-countries have confirmed training needs of specialists on PP of plants, control and regulatory bodies. Though there are no requirements of advanced training without fail of PP specialists at some nuclear sites of countries, these sites are interested in advanced professional training of specialists on PP.

Almost all countries need instructor training for specialists training of lower and middle ranks at their sites. Conducted inquiry resulted in subject that 145 specialists need the advanced training, 19 specialists need the retraining, and 69 specialists need the basic training in the field of PP. Also it is necessary to train 110 instructors.

The main directions of activity on which training is necessary and number of specialists who need to be trained are following:

№	Direction of activity	Number of specialists who need			
		advanced training	retraining	basic training	instructor training
1	PPS design	30	5	17	21
2	Setting into operation and PPS operation	48	10	42	24
3	PP management	54	6	14	20
	Total	**132**	**21**	**73**	**65**

Special emphasis places on needs of member-countries in training and advanced training of security officers on nuclear sites, and staff of security services connected with protection of nuclear material and nuclear facilities.

Appendix C.4. NIS/Baltics Training Needs Assessment Workshop Agenda and Participants List

Agenda

#	Presentation	Time
January 28		
1	Opening of a workshop.	$10^{00} – 10^{30}$
2	The Workshop objectives and tasks. V. Gavrilyuk, D. Beck, D. Dickman, J. Kuzminski	$10^{30} – 11^{30}$
	Coffee-Break	*11^{30}- 11^{50}*
3	Select of the Working Group Members for Workshop decision preparing	11^{50} - 12^{20}
	Lunch	*$12^{20} – 13^{00}$*
4	Session of the working group of duty distribution	$13^{00} – 13^{30}$
Presentations of representatives of the Workshop participants countries		
Latvia		
5	J. Strebkovs	$13^{30} – 14^{00}$
Lithuania		
6	M. Davainis Control of Nuclear Material and Nuclear Facilities in Lithuania	$14^{00} – 14^{20}$
7	V. Šlaustas PP Organization on Ignalina NPP and Needs for Training in the Field of PP	14^{20} - 14^{40}
	Coffee-Break	**$14^{40} – 15^{00}$**
Azerbaijan		
8	I. Tejmurov State of PC&A of Nuclear and Radioactive Materials in Azerbaijan Republic and Needs for Training of Specialists	$15^{00} – 15^{30}$
Armenia		
9	L. Haratyunyan Needs for Advanced Training of Armenian Specialists in the Field of MPC&A	$15^{30} – 15^{50}$
10	M. Shahinyan Physical Protection of Armenian NPP	$15^{50} – 16^{10}$
Georgia		
11	G. Basilia State of Physical Protection, Accounting and Control of Nuclear Material in Georgia	16^{10}-16^{40}
Reception 17^{00}		

January 29		
12	The tour for Workshop participants	9^{00} - 12^{00}
	Lunch	***12^{15} – 13^{00}***
	Belarus	
13	E. Krevsun, L. Boyko Safeguards and Physical Protection – the Belarus Experience During Seven Years	13^{00} – 13^{20}
14	U. Sonin, V. Paliukhovich Physical Protection of Nuclear Facilities and Material, Accounting and Control of Nuclear Material in Belarus Republic	13^{20} – 13^{40}
	Uzbekistan	
15	Kh. Khalilov State System of Accounting and Control of Nuclear Materials and Their Physical Protection in Uzbekistan Republic	13^{40} – 14^{00}
16	A. Rakhimbaev Physical protection of VVR-CM Reactor	14^{00} – 14^{20}
	Kazakhstan	
17	G. Yeligbayeva, C. Massenov, M. Shaldybaev	14^{20} - 14^{40}
18	D. Karshalov	14^{40} – 15^{00}
	Coffee-Break	*15^{00} – 15^{20}*
Kyrgyzstan		
19	K. Noruzbaev Needs for Training of Specialists in the Field of MPC&A in Kyrgyzstan Republic	15^{20} – 15^{50}
Tajikistan		
20	T. Khikmatov The Republic of Tajikistan's Needs for Training of Specialists in the Field of Physical Protection, Accounting and Control of Nuclear Materials	15^{50} – 16^{20}
21	General discussion	16^{20} – 17^{20}
	January 30	
22	Session of working group with respect to preparation of the Workshop decision.	9^{30} - 10^{30}
	Coffee - Break	*10^{30}- 10^{50}*
23	Examination of the draft decision by Workshop participants.	10^{50} – 12^{30}
	Lunch	*12^{30} - 13^{30}*
24	Discussing and decision modification.	13^{30} – 14^{30}
	Coffee-Break	*14^{30} – 14^{50}*
25	Decision making	14^{50} – 15^{20}
26	Summarizing of Workshop	15^{20} - 16^{20}

NIS/Baltics Participants (GKTC and US assessment team also participated)

No	Full name	Place of work, position	Work address	Work phone, fax, e-mail	Passport data
Belarus					
1	Edward Krevsun	The Joint Institute for Power and Nuclear Research – Sosny, Leading Research Assistant	99, Acad. A. Krasina St., Minsk, Belarus, 220109	Ph.: +375 (17) 299 3833 Fax: +375 (17) 299 4355 krevsun@sosny.bas-net.by	Passport # MP 0202821 Surname: Krevsun Given names: Edward Date of birth: 29/09/1940 Place of birth: Ukraine Date of issue: 18/12/1997 Date of expiry: 29/09/2040
2	Leonid Boyko	The Joint Institute for Power and Nuclear Research – Sosny, Deputy Chief Engineer, Head of Department of PP of NM	Acad. A. Krasina St., Minsk, Belarus, 220109	Ph.: +375 (17) 299 4553	Passport # MP 0442385 Surname: Boyko Given names: Leonid Date of birth: 22/10/1939 Place of birth: Ukraine Date of issue: 14/01/1999 Date of expiry: 22/10/2039
3	Vasili Paliukhovich	Promatomnadzor, Chief State Inspector	86/1, Kazintsa St., Minsk, Belarus, 220108	Ph.: +375 17 2786084 Fax: +375 17 2786083 safeatom@infonet.by	Passport # MP 1308523 Surname: Paliukhovich Given names: Vasili Date of birth: 01/12/1957 Place of birth: Ukraine Date of issue: 04/06/2002 Date of expiry: 01/12/2057

4	Uladzimir Sonin	Promatomnadzor, Head of Division	86/1, Kazintsa St., Minsk, Belarus, 220108	Ph.: +375 17 2070941 Fax.: +375 17 2786083 safeatom@infonet.by	Passport # MP 0081967 Surname: Sonin Given names: Uladzimir Date of birth: 29/05/1946 Place of birth: Russia Date of issue: 20/05/1997 Date of expiry: 29/05/2046
Azerbaijan					
5	Ibragim Ali ogly Tejmurov	Gosgortechnadzor, Head of Inspection on Radiation Safety Oversight	26, S. Vurguna St., Baku, 370000	Ph. (99412) 93-02-75 tech@nadzor.baku.az	Passport # S 0106712 Surname: Teymurov Given names: Ibrahim Date of birth: 31/12/1932 Place of birth : Fizuli, Azerbaijan Date of issue: 11/10/2000 Date of expiry: 11/10/2005
Armenia					
6	Levon Harutyunyan	Armenian Nuclear Regulatory Authority, State Inspector	4, Tigran Mets St., Yerevan, 375010 Armenia	Ph.: 3741 581 654 Fax: 3741 543 997 l.harutyunyan@anra.am	Passport # AA0279032 Surname: Harutyunyan Given names: Levon Date of birth: 13/07/1945 Place of birth: Republic Azerbijan Nationality: Republic of Armenia Date of Issue:11/01/1996 Date of expiry: 11/01/2006

7	Mushegh Shahinyan	ANPP Co., Metsamor, Deputy General Manager on Physical Security	ANPP, Armavir region – 6, 377766	Ph.: 3741 286 402 Fax: 3741 288 580 anpp@anpp.am	Passport # AA 0239989 Surname: Shahinyan Given names: Mushegh Date of birth: 30/06/1949 Place of birth: Republic of Armenia Nationality: Republic of Armenia Date of Issue: 09/09/1995 Date of expiry: 09/09/2005
8	Tigran Aghajanyan	National Security Service, Expert	104, Nalbandyana St., Yerevan	Ph.: 3741 548 104	Passport # AA 0248617 Surname: Aghajanyan Given names: Tigran Date of birth: 19/06/1959 Place of birth: Republic of Armenia Nationality: Republic of Armenia Date of Issue: 07/08/1995 Date of expiry: 07/08/2005

Georgia					
9	Grigol Basilia	Nuclear and Radiation Safety Service of Georgia, Principal Specialist	87, Paliashvili St., Tbilisi	Ph.: +995 32 25-1632 Fax: +995 32 94-7597 brus@access.sanet.ge	Passport # 0719027 Surname: Basilia Given names: Grigol Date of birth: 18/10/1963 Place of birth: Georgia Date of issue: 28/03/2001 Date of expiry: 28/03/2006
Uzbekistan					
10	Kholbaj Khalilov	Agency on Safety in Industry and Mining, Deputy Head of Atomic Inspection	27, M-14, Tashkent, 700011, Republic of Uzbekistan	Ph.: +99871 144-1317 Fax: +998 71 144-1317 144-2104 hasan@tkt.uz	Passport # CB1757625 Surname: Khalilov Given names: Kholbaj Place of Birth: Samarkand, Uzbekistan Uzbekistan Citizen Date of issue: 04/01/2003 Date of expiry: Unlimited Validity
11	Alimzhan Rakhimbaev	Chief of PP Service of VVR-CM of Institute of Nuclear Physics, Academy of Science of Republic of Uzbekistan	Ulugbek, Tashkent, 700132	Ph. 998-712 64-87-41 Fax: 998-712 64-87-41 99871 144 21 04 olim@inp.uz alimjonr@mail.ru	Passport # CA0163257 Surname: Rakhimbaev Given names: Alimzhan Place of Birth: Tashkent, Uzbekistan Uzbekistan Citizen Date of issue: 19/09/1995 Date of expiry: 16/06/2015

Tajikistan					
12	Turonsho Khikmatov	Nuclear and Radiation Safety Agency, Academy of Science of Republic of Tajikistan, Principal Engineer of Department of Information and International Relations	33, Rudaki Pr., 734025, Dushanbe, Pebublic of Tajikistan	Ph.: (992 372) 21-5083 21-5084 Fax: (992 372) 21-4911 academy@science.tajik.net	Passport # N 013711 Surname: Khikmatov Given names: Turonsho Date of birth: 25/04/1979 Place of birth: Tajikistan Date of issue: 19/10/2001 Date of expiry: 19/10/2006
Kyrgyzstan					
13	Kubanychbek Noruzbaev	Department of Ecology and Nature Management under Ministry of Ecology and Emergencies of Kyrgyz Republic, Chief of Economic of Nature Management Section	142, Gorkogo St., Bishkek, 720005, Kyrgyz Republic	Ph.: (996 312) 428986 Fax: (996 312) 428986 demos@intranet.kg	Passport # A038 0998 Surname: Noruzbaev Given names: Kubanychbek Date of birth: 09/07/1947 Date of issue: 24/03/1998 Date of expiry: 10/03/2008 Authority: MFA 50-55
Kazakhstan					
14	Gulnara Yeligbayeva	Atomic Energy Committee, Ministry of Energy and Mineral Resources of Kazakhstan, Deputy Head of Nuclear and Radiation Safety Administration	4, Chajkinoj St., Almaty, Kazakhstan, 480020	Ph.: +7 3272 64-27-72 Fax: +7 3272 63-33-56 E.Gulnara@atom.almaty.kz	Passport # 2390076 Surname: Yeligbayeva Given names: Gulnara Date of issue: 31/05/1999 Date of expiry: 23/10/2004

15	Chingis Massenov	Atomic Energy Committee, Ministry of Energy and Mineral Resources of Kazakhstan, Head of Material Control Division	4, Chajkinoj St., Almaty, Kazakhstan, 480020	Ph.: (8 3272) 64 27 72 Fax: (8 3272) 63 33 56	Passport # S 0007315 Surname: Massenov Given names: Chingis Date of birth: 18/06/1950 Place of birth: Kazakhstan Date of issue: 21/05/2001 Date of expiry: 21/05/2006
16	Damer Karshalov	National Atomic Company "Kazatoprom", Chief of Security Service	168, Kabanbaj batyra St., Almaty, Kazakhstan	Ph.: 7 3272 58-39-35 Fax: 7 3272 50-35-41	Passport # 2981837 Surname: Karshalov Given names: Damer Date of birth: 29/06/55 Place of birth: Kazakhstan Date of issue: 07/11/2000 Date of expiry: 07/11/2010
17	Marat Shaldybaev	Atomic Energy Committee, Leading Specialist of Material Control Department	4, Chajkinoj St., Almaty, Kazakhstan, 480020	Ph.: (8 3272) 64 27 72 Fax: (8 3272) 63 33 56	Passport # 3812307 Surname: Shaldybaev Given names: Marat Date of birth: 26/03/68 Place of birth: Kazakhstan Date of issue: 18/07/2003 Date of expiry: 17/07/2013

Latvia					
18	Jūlijs Strebkovs	Radiation Safety Centre, Deputy Director, Head of Inspection Department	165, Maskavas St., Riga, LV-1019	Ph.: +371 703-26-82 Fax: +371 703-26-59 J.Strebkovs@rdc.gov.lv	Passport # 0613994 Surname: Strebkovs Given names: Jūlijs Date of birth: 09/03/1938 Place of birth: Russia Citizenship: Latvia Republic Date of issue: 13/09/1995 Date of expiry: Unlimited Validity
Lithuania					
19	Vytautas Šlaustas	Ignalina NPP, Deputy General Director on PP	LT – 4761, Visaginas, Lithuania	Ph.: 370 386 28340 Fax: 370386 31742 igs@mail.iae.lt	Passport # 20259300 Surname: Šlaustas Given names: Vytautas Date of birth: 03/01/1955 Place of birth: Akmene Nationality: Lithuanian Date of issue: 15/05/2003 Date of expiry: 15/05/2013

20	Marius Davainis	VATESI State Inspection on Atomic Energy Safety, Deputy Chief of NM Control Department	3, Šermukšnių St., LT-2600, Vilnius Lithuania	Ph.: 370 5 266 1562 Fax: 370 5 261 4487 marius@vatesi.lt	Passport # LC 421872 Surname: Davainis Given names: Marius Date of birth: 17/01/1975 Place of birth: Vilnius Nationality: Lithuanian Date of issue: 17/11/1999 Date of expiry: 17/12/2009

Appendix C.5. NIS/Baltics Training Needs Assessment Workshop Presentations

Presentation summaries included are (listing below follows country order, not agenda):

- **Armenia**
  - On assessment of needs for advanced training of the experts representing the Armenia republic in area of PP and MCNA [State].....C.5-2
  - On assessment of needs for advanced training of the experts representing the Armenia republic in area of PP and MCNA [NPP] C.5-3
- **Azerbaijan**
  - On assessment of needs for advanced training of the experts representing the Azerbaijan republic in area of PP and MCNA C.5-4
- **Belarus**
  - The Physical Protection of NM and nuclear facilities, MCNA in the Belarus Republic.....C.5-7
  - Safeguards and physical protection—the Belarus experience during seven years C.5-9
- **Georgia**
  - Current status of the physical protection and MCNA of NM in Georgia C.5-10
- **Kazakhstan**
  - Main principles of organization and supervision in MCNA area in Kazakhstan C.5-13
  - Main principles of organization and supervision of physical protection of nuclear materials and nuclear facilities in Kazakhstan.....C.5-14
- **Kyrgyzstan**
  - Training needs of the staff in PP and MCNA in Kyrgyzstan.....C.5-15
- **Latvia**
  - On assessment of needs for advanced training of the experts representing Latvia in MCNA.....C.5-16
- **Lithuania**
  - Current status of physical protection (PP) and needs in experts training in PP at Ignalina NPP.....C.5-17
  - Control of nuclear material and nuclear facilities in Lithuania.....C.5-19
- **Tajikistan**
  - The Republic of Tajikistan's needs for training of specialist in the field of physical protection, accounting and control of nuclear materials C.5-20
- **Uzbekistan**
  - The State system of MCNA and physical protection in Uzbekistan .C.5-22
  - Presentation on the physical protection of VVR-CM reactor C.5-25

4.On assessment of needs for advanced training of the experts representing the Armenia republic in area of PP and MCNA

L.Arutunian
State supervision Body

The Armenian NPP was turned into commission in 1976, design was developed in 1969. The PP system existing back then was proper for that time: it was designed based on the ideas typical for that time understandings of possible threats towards NF. The social-political processes that had happened during the last decade like the terrorism activation, 9/11, 2001 events made us to significantly review the PP concept of NM and NF for the more close collaboration in that area.

Due to the need to review the old approach of NPPs PP and to resolve the state PP system issues the Armenian government has established the interministerial commission on PP issues of NM that includes the members of State supervisory body SSB), police, National Security Service and NPP. February last year the SSB was authorized by the government to regulate PP of NM and NF.
There is a need for the training and advanced training for the Armenian experts of various levels like SSb staff, operators, utility, security divisions to resolve the issues of PP in accordance with international requirements.

Whole spectrum of activities was completely covered in the Training center materials called" Activity in area of PP, MCNA and its description". The major attention shall be paid to development of legislative part of PP. We have already developed the " Concept of the PP, NPP and NM security enhancement" , "Rules of NPP PP and NM" that were approved in September 2003 and caused us big scope of work to develop legislative provisions on PP (standards, rules, provisions).

Other area of activity – licensing of the PP activity. The licensing requirements are the most important end effective measures aimed for the nuclear activity to follow the laws. That is why the definition of nuclear kinds of activities that are subject to be licensed and the procedure of licensing are very important both for the regulator and the operator. But the above issue is not reflected in the "Proposed themes of PP of Nm and NF experts training "

The experts of state bodies participating in inspection in PP area have to attend inspectors training and advanced training. They also have to be aware of methods analysis of the protection level , effectiveness of the PP system functioning.

The legislative provisions needed for creation of reliable and clearly organized system of regulating requirements and conditions for the licensing in area of PP and shall become the basis for the unique administrative actions on various levels.

5.On assessment of needs for advanced training of the experts representing the Armenian republic in area of PP and MCNA

M.Shaginjan, Armenian NPP

The issues of training, retraining and advanced training of the plant and plant security staff is highly important for the Armenia and the Armenian NPP and demands urgent resolving. It is due to the following reasons:

The Armenian NPP is situated in a highly residing area of the Ararat valley, 29 km distanced from Erevan and 17 from the Turkish border. The ANPP consists of 2 VVER 440 power units . The power unit 2 is currently in operation and was designed back in late 60-es the external controlled zone was built according to the Soviet concept of PP of NPPs.

Before the USSR collapse the training of the NPPs experts was conducted in the Russian Federation . Until current time the Npp keeps using the Russian legislative-technical provisions having no local ones available. We are highly interested to attend workshops hoping that it will help us to resolve the currently existing problems. The themes proposed for the NM and NF area experts will enable the PP services and response teams staff to gain proper theoretical and practical skills in organizing and conducting of PP events. The most acute themes from The proposed ones for us are:

- Design threat assessment method, vital areas definition
- Assessment and analysis of PP system vulnerability
- Test conducting and turning into operation of the PP system

The training of experts and creation of the training class on the Armenian territory will accelerate the Npp staff education on issues how to operate the PP system and the response team to properly organize their and secure the site.

Proposal: to include into the PP managers training the topics on licensing, organization and conduction of PP events , PP inspection, PP management facilitating the interactions between the operators and response teams .

I strongly hope the courses to be effectively organized for the UIS and Baltic states to successfully improve the issues of PP resolving .

3. On assessment of needs for advanced training of the experts representing the Azerbaijan republic in area of PP and MCNA

Aliev Sabir Galandar Ogly, Chief Inspector on Radiation safety supervision of State Technical Supervisory Body(STSB), Azerbaijan

The Republic of Azerbaijan very actively participates in the International Community efforts follow the international nuclear safety rules and makes steps towards the rules enhancement.

The policy of our state in this area is based on the principles of international cooperation and openness.

In may 2001 Azerbaijan has become the member of the IAEA.

The Law '" On radiation safety of population" was issued back in 1997; the Law " On environmental safety " – in 1999. All the Decrees of the President and the Cabinet of Ministers following these laws were aimed on infrastructure of radiation safety improvement and on definition of regulatory functions of corresponding ministries and departments on control over Sirs and radioactive wastes.

In 1998 Azerbaijan has signed the Agreement on safeguards due to the Nuclear Weapon Non-proliferation Agreement as well as the Protocol attached. In 2000 the state has signed the Additional Protocol to the Safeguards Agreement. Currently the work on " Basic regulations and rules of radiation related safety provision of Azerbaijan Republic" has been completed that is an integral part of national infrastructure. The experts of STSB were very actively participating in developments of those regulations and rules.

The regulatory infrastructure of Azerbaijan on radiation safety provision in accordance with the law " On radiation safety of population" and its following regulations is based on the competent bodies:

- The State commission for cooperation between Azerbaijan and the IAEA founded due to the Decree of the President dated 2002
- The State committee on supervision over safe activity in the industry and mauntinery supervision that according to the law is the regulatory body , responsible for safe transportation, storage and use of radioactive materials and resources in the state and for the independent control over all kinds of activities in area of radiation related safety. (See below the diagram of the inspection activity, Diagram 1,2)
- The Azerbaijan Center for Hygiene and epidemiology with the Ministry of health care is the regulatory body responsible for the sanitary inspection and regulatory control over use of SIRs as well as for the "sanitary-hygienic passport"
- The Ministry of National Safety is responsible for the lost sources of radiation, inventory and control over all sources of irradiation, for PP provision, contraction against illegal circulation and wastes transportation.

Ministry of Environment and Natural resources is responsible for final disposition of radioactive wastes, development of programs on envinroment related protection

I would like also to mention the fact of creation of working group of experts with the Cabinet of Ministers, consisting of leading experts of all ministries and departments, using radioactive materials, as well as the services including law enforcement ones, responsible for MCNA, safe transportation and storage of NM.

Radioactive materials and SIR in Azerbaijan are in use in medicine, oil extraction , geology industry, chemical industry, for research purposes as well as for the control of the quality of the products

Currently there are no nuclear facilities available in Azerbaijan. There are no NPPs, no spent fuel processing factories, no research reactors and facilities. Some kind of sources, like ones used for researches or for the radiography control of welding, are stored in the depleted uranium containers. After the research works are completed or the warranty time of sources is over they are sent by the enterprises back to the manufacturers. The regulatory body on a regular basis controls over the delivery and transportation back of the sources and depleted uranium containers. (The body presents the transportation diagram of the SIR and NM, Diag.3)

It is worth to mention that it was no MCNA of depleted uranium in form of containers or protective casing at the Azerbaijan territory back in soviet times

Currently in Azerbaijan the state government with the IAEA support carries on the big range of works on inventory and accounting of SIR ant their owners as well as to search and find out SIR with no owners, to enhance the control over illegal transportation of radioactive sources and materials at border areas.

Due to the existing threat of nuclear terrorism and creation of " dirty bombs" using radioactive isotopes, the measures taken on PP and MCNA enhancement tends to look very acute.

The Institute for radiation issues with the Academy of Sciences of Azerb. As well as other agencies have proposed the project on creation of the National center for nuclear safety , radiation safety and experts assessment to the IAEA for its review. Taking into account strategic geographical location of Azerbaijan it is suitable for legal and illegal transportation of radioactive and nuclear materials and equipment as well as the products of dual use.

The creation of the center can be helpful to the customs services and border troops to prevent the illegal transportation of NM, equipment, technologies in compliance with international experience and standards.

This center can also be responsible for the improvement of radiation safety structure, conducting of monitoring, participation in incidents with RM and NM.

Thanks to the IAEA technical assistance the center will be equipped with the most modern devices with software. Due to the said above I would like to emphasize on the acute need in training of highly qualified personnel in the area of non-destructive method of NM measurement. The G. Kuzmicz Training Center jointly with DOE, USA are planning to train experts in these topics.

Even currently the research activities are underways on gamma-irradiate facilities where the radioactivity of some sources (Cs-137, Co-60) riches e few thousand of Curie at the Institute for radiation issues. It makes the principles of RP system in condition of highly radioactive sources use very important, that are being implemented in a way of administrative and engineering-technical measures , including creation of physical barriers. Due to this the experts training in PP design as well as its operation becomes highly important for our state.

I would also like to mention the fact of the big reconstruction as well as new premises construction at the Isotop enterprise that were financed by the European Union. The enterprise was established for the radioactive wastes storage and is strategically important for the entire Caucasus region.

The modern advanced technologies on conditioning, processing, final disposition and radioactive wastes storage were used while constructing these premises and were also approved by the IAEA. The construction of the storage for the Sirs with no owners that are currently stored at various facilities ,

enterprises and military divisions, in the special compartments for the Radium – 226, producing the Radonium gas is also planned for construction.

As we know the PP system is all aimed to prevent the unauthorized seizure of the nuclear and radioactive materials or sabotage towards materials and facilities.

The general approach means to secure from threats in a way of system building based on the composition of personnel, technical means, procedures taking into account their compatibility with the facility safety.

Due to this the personnel training in design, operation and PP management is the priority task to prevent unauthorized seizure of Nm or sabotage as well as preparation of necessary procedures at so strategically important facility for storage and final disposition of sources, equipped with modern electronic hardware, wastes processing equipment.

For the State system of PP to be capable to minimize the threat of unauthorized seizure of NM and sabotage towards enterprises and facilities it has to have the features for detection, assessment, capture and response. As a result the enterprise shall be equipped with the surveillance and control detectors, proper number of staff, information transfer system, proper number of physical barriers such as fences, walls, doors, lockers, etc

The Ministry of the State Security deals with the state supervision of the PP of the radiation related facilities as well as response to incidents, related to thefts and loss of radioactive sources.

There is a need for the proper professional training for the effectiveness and potentials growth for the special forces response and for control over specialized radiation related facilities.

We can make available the list of candidate from the various agencies using RM to attend both the basic and instructors & experts training. Our republic is very much in need for highly qualified personnel.

Based on the said above I would like to mention that the issue of the personnel training in the PP, MCNA and radioactive sources use areas is not only the nationally important task but also internationally important due to the treat of international nuclear terrorism

6. The Physical Protection of NM and Nuclear Facilities, MCNA in the Belarus Republic

V.Poluhovich, V. Sonin, Department for Supervision over Safe working in industry and nuclear energy
Ministry of Emergency of Belarus (Promatomnadzor)

The Belarus republic is the member of the Nuclear Weapon Non-proliferation agreement (1993), Convention on Physical Protection of NM (1993),, Vienna Convention on civil responsibility for the nuclear damage, (1998), Convention on nuclear safety (1996), Agreement on Total ban of nuclear testing and other bilateral and multilateral agreements related to the nuclear safety and nuclear weapon non-proliferation. Promatomnadzor rules the process of the agreements fulfillment.
In 1993 Belarus has joined the Convention on PP of NM. The Decree of the Cabinet of Ministers dated 24.05.1993 " On measures on PP of NM" has stated that Promatomnadzor is appointed as a state competent body on PP of use, storage and transportation NM and NF. In 1994 Promatomnadzor has developed and approved " Provision on PP of use, transportation and storage of NM"
In an area of PP Promatomnadzor manages the following types of activities:

- Collaboration with IAEA and regulatory bodies of other countries on issues of PP in case of NM transfers
- Coordinates activities aimed on Convention of PP of NM fulfillment

By the Decree of the Cabinet of Ministers dated 08.06. 1993 # 373 " On measures to fulfill the Agreement on nuclear weapon non-proliferation ' Promatomnadzor was appointed as a state competent body of creation and implementation of the state MCNA system. This system accounts all nuclear materials available of the territory of Belarus and are subject to follow criterions stated in The safeguards Agreement. The entire system consists of two levels: accounting and control on a facility level and on the national level carried on by Promatomnadzor.

It worth to say that whole NM is located at the single site – Joint institute for energy and nuclear researches – "Sosny" with the National Academy of Science of Belarus (hereinafter Sosny). There are 2 subcritical assemblies, NM storage, spent fuel storage, research labs available in the institute. The subcritical assembly driven by the neutrons generator was turned into operation. The way of the MCNA process at facilities reflects their design and a way of NM use.

The following types of NM are in use at the facilities:

- Highly enriched Uranium, more then 20% enrichment on U 235
- Enriched uranium up to 20% on U 235
- Natural and depleted Uranium and its compounds
- Materials in small batches that are pure or the mixture of above materials, including scrap
- Small batches of plutonium and Torii

The NM are in various physical forms like assemblies, powders, solutions, pellets and scrap.

The storage of the spent fuel of the Mobile 'Pamir" plant remaining after the works completed in Belarus remains the issue. Currently the spent fuel is being stored under water in the temporary Sosny storage (43 kg of Uranium, 45% enrichment). It constantly demands financial expenses. This is the temporary storage and is potentially hazardous.

Provisions regulating MCNA system functioning:

- Structure of MCNA of Belarus (# r 129-96)
- Provision on supervision over MCNA in Belarus
- Temporary provision on procedure of MCNA implementation
- Requirements towards MCNA and their use, transportation, storage in research reactors, critical and subcritical assemblies, research labs and facilities.
- Requirements towards reporting documentation to be submitted to the state competent body
- Provision on IAEA safeguards fulfillment

SAVEGUARDS AND PHYSICAL PROTECTION - THE BELARUS EXPERIENCE DURING SEVEN YEARS

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"The Joint Institute of Energy and Nuclear Researches – Sosny" (SOSNY),
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The SOSNY, which is located not far from Minsk, is basically a traditional national nuclear research center. The total number of personnel working on-site is approximately 1,500. All special nuclear material is located at two storage facilities. Before 1997, the Material Protection, Control and Accounting (MPC&A) system was on an about primitive level. In 1994-1996, four countries (Sweden, Japan, USA and Belarus) had connected efforts under the aegis of the IAEA to upgrade the MPC&A system in Belarus to parameters coming near to the IAEA recommendation. In brief, Sweden was responsible for the design of the protection system and the installation of the security system. Japan provided the equipment. The USA was responsible for equipment, funding various parts of system and training of the staff. The Belarusian side undertook the constructive work.

As result of warm work of the all parties, the goal was achieved by end of 1996. By this moment, the MPC&A system had worked enough smoothly during more than seven years.

Now from experience we can estimate the cumulative and future problems in this deal.

There are many technical problems. However the most important problem is the problem on providing of required skill level and responsibility of the personnel, who serves the MPC&A system.

We plan to change internal process of preparation of personnel, and also procedures of examination for staff. In connection with above-stated, training of our personnel in the Kiev Center will be rather useful matter.

The Belarus experience testifies that there is a unique path for increase of nuclear and radiation safety: cooperation and exchange by experience in a global scale.

Current status of the Physical Protection and MCNA of NM in Georgia

Lia Chelidze, leading expert of nuclear and radiation related safety department

Georgia has become the member of the IAEA in 1997.
The development of legislative base has become an outcome of this activity that gives the ground for the activities in the area of nuclear and radiation related safety.
Georgia is not a nuclear country.
The above said irrespective there is certain amount of NM available on the Georgian territory as well as the experimental nuclear facility being operated at zero power.
The Institute of Physics with the National Academy of Science have had a research reactor (constructed in 1959) of IRT-M design which capacity was raised as an outcome of two reconstruction from 2 MW up to 8 MW.
Back in 1987 according to the Decree of the national Academy Board the reactor was decommissioned due to the end of the operation term.
All the fuel (800 gr of spent and 5 kg of enriched) was transported outside of the country with the IAEA assistance.
The Georgian experts being assisted by the IAEA were working on the reactor decommissioning program that was completed back in 2002.
The technical assistance project was received by the Institute of Physics (GEO/4/002) – " To transform the research reactor into the low power equipment" for the neutron-activation analysis.
In 2003 Georgia has ratified the Georgia – IAEA Agreement due to the Nuclear weapon non-proliferation agreement and additional protocol on safeguards being issued.
The subcritical assembly ПС –1 is a hard-homogenic operating on heat neutrons.
The reactor core – the uranium-polyethylene fuel mixture enriched up to 36% on U 235 (600 gr mass).
The power regulator can be placed into assembly consisting of the

8

initial neutrons source Pu-Be 238 with the neutrons outcome in 10 neut/ sm^2 /sec.
The facility located in Georgia IP territory does not have any special physical protection and is being secured by the institute personnel.
Georgia is becoming an important link of the transportation corridor due to its location connecting Europe and Asia.

The high scope of the cargoes circulation on all transportation means demands the highly effective control over the smuggling cases. The experience of Interpol and the various states customs services tells that drugs, weapons and currently the radioactive and nuclear materials are the most popular smuggling substances .
The law enforcement agencies staff during the last few years have seizured nuclear and radioactive materials a few times.
The most demonstrative smuggling cases were:

- 998,7 gr of 3,3 % enrichment on U^{235}
- 1700,0gr of 3,4 % enrichment on U^{235}
- 918,0 0f 16% enrichment on U^{235}

Nowadays there is no centralized storage of the nuclear and radioactive substances available in Georgia
Due to that all the nuclear fuel, seizured at the border is being stored jointly with the rests of the spent fuel of the depleted Uranium (600 gr 0,709% enrichment) in the decommissioned reactor with the Institute of Physics that has become responsible for the mentioned substances storage.
The PP measures are being performed by the interior troops forces of Meschetin borrow team on 24 hours basis.
A few enterprises are operating a few containers containing depleted Uranium:

- the oncology center, Kutaisi city, (2 units, 390kg)
- the oncology center, Batumi city,(1 unit, 390 kg)
- Metrology and standardization department (1 unit , 600 kg)

The Abhazia territory tends to be an additional issue due to be out of the Georgia Republic Government control.
There were about 655 gr of highly-enriched U^{235} (90-96%) U_2O in pellets and Pu^{238} -Be sources.
We are currently unaware about the places of these sources storage conditions .
Since the Georgian parliament has ratified the Non-proliferation Agreement and the Additional Protocol the state has become responsible for MCNA and other requirements on a state level .
All above mentioned institutes and enterprises are responsible for safe storage and use of fission materials according to the IAEA requirements.
The Soviet instructions" Rules of storage of spent and fresh fuel" and " Transportation instructions for both spent and fresh fuel "were obligatory and stated the rights and obligations of the responsible personnel of the nuclear reactor team before the reactor was decommissioned and fuel transported outside Georgia. These staff members were trained the special training program accordingly.

The personnel knowledge verification and training on this program were conducted once per two years in a presence of the instructor from the State Regulatory body of the USSR. The clearance for the staff was being issued based on a license by the examine panel to perform its job.

Currently there is no training program available in Georgia to train staff of middle and bottom levels in accordance with the requirements of the provisions on MCNA.

So this kind of training remains one of the important links in following all the IAEA regulations and safeguards, the priority plans of the Georgian department of nuclear and radiation related safety.

So the Georgian republic is in need for:

- Technical assistance to maintain the safety regulations
- Experts missions onsite to carry on the proper policy in the area of nuclear safety
- For the Georgian experts to participate in training programs to get advancely trained and to exchange experience

Main principles of organization and supervision in MCNA area in Kazakhstan

G.Eligbajeva, Nuclear Energy Committee of Kazakhstan

Kazakhstan has well developed nuclear industry – fuel producing plant, research and energy generating reactors. In December 1993 Kazakhstan has signed the Non-proliferation agreement as being the state with no nuclear weapons. According to the close [1] ,p 3, of the above agreement Kazakhstan has signed the IAEA Safeguards agreement also.

The Agreement came into force on August 11, 1995. Since than all the Kazakhstan nuclear materials are all under the IAEA safeguards.

Close 7 of the Agreement accordingly a) Kazakhstan controls and accounts all safeguards NM, b) "the IAEA uses the safeguards in a way to be able to verify the Kazakh facilities not to turn peaceful use of NM for military ones". Since than the national MCNA activity has entered a new phase – to adjust the existing MCNA system into the one meeting the Agreements requirements. It has caused the need to establish the State MCNA system. Close 31 accordingly " MCNA system of Kazakhstan is all based on balance zones structure"

In accordance with the Close 5 of the Law "On use of nuclear energy" the MCNA system is being considered a an independent type of activity. The Committee for nuclear energy was stated as the state body that control and supervises the industry as well as fulfillment of the non-proliferation commitments (Governmental Decree # 1442 dated September 23, 2000).the close 7 of the above Law accordingly the State Committee has rights to:

- To license any kind of activity that relates to atomic energy use
- To deal with MCNA on a national level
- To inspect their authorities accordingly
- To collaborate with international agencies on non-proliferation issues and MCNA

Committee as being the state supervisory body is authorized to develop, specify and use regulations that regulate the atomic energy use.

The state MCNA systems main tasks are:

- definition of scope of Nm available in the state
- Recording, registration and accounting documentation maintenance
- Prevention of losses, unauthorized use, thefts of NM
- Infrormation provision on NM circulation and availability to the state bodies
- Control over the fulfillment of the commitments on international agreements on NW non-proliferation.

Main principles of organization of physical protection of nuclear materials and nuclear facilities in Kazakhstan

Ch.Masenov, Nuclear Energy Committee of Kazakhstan

Kazakhstan has the well developed nuclear industry including the ore extraction and processing enterprises like"Kazhatomprom", plant that produces depleted Uranium in pellets for the energy generating and research reactors, Bh-350 NPP being decommissioned at the moment as well as a few research reactors in the National nuclear center (there are 25% of the world Uranium ore deposits available in) . In December 1993 Kazakhstan has signed the Non-proliferation agreement as being the state with no nuclear weapons. According to the close [1] ,p 3, of the above agreement Kazakhstan has signed the IAEA Safeguards agreement also.
The Agreement came into force on August 11, 1995. Since than all the Kazakhstan nuclear materials are all under the IAEA safeguards.
Currently there are three main agencies to control over NM that consists of 3 interrelating components

- The national MCNA system (agency)
- PP system of NM and NF
- To control over exporting and importing of NM, technologies, dual use materials and dual use technologies

The final objective of the PP system of the Committee – measures to prevent NM thefts and sabotage at facilities. The necessary elements needed to successfully perform the measures are: legislative provisions and bodies availability authorized to prevent an unauthorized assess to NM.
The legislative base includes:
1. Law on nuclear energy use dated 14.03. 1997
2. Law on licensing, 17.04.1995
3. Governmental decree: Issues for the Committee on nuclear energy with the Ministry of energy , industry and trade of Kazakhstan", 23,09, 2000
4. Governmental decree " provision on licensing of the nuclear energy use", 12.02.1998
5. Governmental decree " List of the state bodies authorized to issue licenses to the activities that are in need for", 29,12, 1995
6. "Provision on physical protection of NM and NF", 31,03, 1994
7. "Physical protection of NM and NF", IAEA INFCIRC/225/rev.4

The Committee is authorized for following:
- to develop the legislative base
- to issue licenses for works
- to control the following of the license rules
- to conduct inspections
- to collaborate with the authorized bodies of the other states and with the international agencies

Currently the Committee actively participates in measures to retrain staff, to equip the security teams at the sites with modern equipment, to facilitate their interactions between themselves and with other state bodies. To set up the PP system to properly meet all the licensing requirements is the main requirement for the facilities to obtain licenses

Training needs of the staff in PP and MCNA I in Kyrgyzstan

K. Noruzbajev
Nature and environment department of the Ministry of environment and emergency of Kyrgyzstan

Currently there are no nuclear reactors and facilities available in Kyrgyzstan. The republic is the member of the Non-proliferation agreement. The republic has also ratified its membership in the IAEA in 2003.
The safeguards Agreement was also ratified, now are getting prepared to sign the Additional protocol
The Kyrgyz republic exports yellow cake to other countries.
Before 1996 we were processing on our territory the Uranium containing ores to get yellow cake. At the moment we keep processing the Uranium containing concentrates received from the other countries.
There are big scope of ore processing wastes containing the uranium radionuclides.
There is also the radioactive wastes storage facility available in Kyrgyzstan containing mainly the SIRs in casing for the own use.

1. **On assessment of needs for advanced training of the experts representing Latvia in MCNA**

J. Stebkov, Center for radiation related safety

1. Information about nuclear facility available in Latvia

Information about availability of NM at other facilities.

Information on other nationally important facilities that operate SIRs (in accordance with Law of Latvian Republic

2. Information on the Provision of Cabinet of Ministers of Latvian Republic 2002 " Requirements of PP of SIRs"
3. Information on current status of MCNA in Latvia

Information about personnel, dealing with MCNA and its qualification. Assessment of the state's needs in training of personnel in MCNA

4. Information on tasks performed, stated in the above mentioned Provision.

State's needs assessment in PP and MCNA experts

2. Current status of Physical Protection (PP) and needs in experts training in PP at Ignalina NPP.
V. Shlaustas, Deputy Director General of Ignalina NPP

The Ignalina NPP is situated at north-west of Lithuania, on Drukshaj lake shore not far from the Belorussian border. Two types of RBMK – 1500 reactors are being operated there, the first one was turned into operation in December 1983, second one – in August 1987.

The INPP is generates about 80% of energy generated in Lithuania
The General Director is in charge of the plant. The overall management contains 3 directions and 4 services.
The PP service and its main tasks.
International legislative provisions defining roles of PP system
Legislative provisions stating the roles of PP
Site provisions stating roles of PP s
Internal Lithuanian instructions participating in NPP security and its functions
The Map of the NPP area. Peculiarities of the zone and access control. control

- matches the sanitary zone
- border zone security area

Plant map

- location of main premises and buildings
- galleries for walking
- example of main site – 5 km

Access control points

- for NPP personnel
- for auto and rail cars

alarm and video-surveillance systems

- Was upgraded back in 2000 with the Sweden support

Engineering security means

- barriers
- gates

Technical security means

- optics- fiber system

Central security board

- working place of operator
- system of monitors (screens)

spent fuel storage

Spent fuel is being stored in specially equipped site in containers of "Constor" type. Was turned into operation on 6 of December 1998 and is distanced from the main site. Equipped with separate PP system

Spent fuel transportation

Fresh fuel transportation within the Lithuanian territory.

- transportation is secured by the Control center of Lithuanian military troops

Spent fuel transportation

- secured by the guards team of INPP

Needs of INPP in PP of NM and NF experts

		Number of staff in need of	
#	Activity	Advanced training	Instructors training
1	PP system design	4	1
2	Turning into operation &operation of PP system	1	1
3	PP system management	10	1

Needs of NPP guards team to train experts in PP of NM and NF

		Number of staff in need of	
#	Activity	Advanced training	Instructors training
1	PP system design	2	1
2	Turning into operation&operation of PP system	5	1
3	PP system management	19	3

CONTROL OF NUCLEAR MATERIAL AND NUCLEAR FACILITIES IN LITHUANIA

M. DAVAINIS
State Nuclear Power Safety Inspectorate (VATESI)
Vilnius, Lithuania

In March of 1990 Lithuania declared its independence and in 1991 Ignalina Nuclear Power Plant (INPP) with two operating units, among the most powerful ones in the world, finally came under the authority of the Republic of Lithuania.

The same year, 1991, on the 23rd of September Lithuania signed the Treaty on the Non – proliferation of Nuclear Weapons. Shortly after, on the 1st of November, the State Nuclear Power Safety Inspectorate (VATESI) was established. The regulatory control of Ignalina NPP was assigned to it.

INPP, the only nuclear facility in Lithuania at that time, and nuclear material in Lithuania have been placed under comprehensive IAEA Safeguards. The agreement between the Government of the Republic of Lithuania and the International Atomic Energy Agency (IAEA) for the application of Safeguards was signed in October 1992. In March 1998, Lithuania signed and in March 2000 ratified the Additional Protocol to the Safeguards agreement. It came into force on 5 July 2000. In the beginning of 2001 Lithuania submitted to the IAEA the initial declarations pursuant to articles 2 & 3 of the Additional Protocol. The declarations are renewed annually.

1 May 2004 is the date of accession of Lithuania to the European Union (EU). That will bring changes to the Safeguards application in Lithuania. The direct Safeguards Agreement between the Government of the Republic of Lithuania and the IAEA and its Additional Protocol will cease to be in force. The Safeguards Agreement between the IAEA, Euratom and non-nuclear weapon EU states and its Additional Protocol will take over. The role of the national state system of accounting and control of nuclear materials has to be reconsidered. Changes to the Law on Nuclear Energy have been adopted foreseeing fewer responsibilities for VATESI, as Nuclear Material Control Authority, in the nuclear material control area.

On the contrary, physical protection of nuclear material and nuclear facilities is a matter of a national competence first of all. Following recommendations of the International Physical Protection Advisory Service (IPPAS) mission in Lithuania in 1999, legislation in the area of physical protection was consolidated. Design basis threat concept was introduced in the Law on Nuclear Energy.

The law sets the role and competence of various institutions in the nuclear energy field. Ministry of Economy, Ministry of Defense, Ministry of the Interior, State Security Department, VATESI and Physical Protection Service at INNP are the key players in the area of physical protection.

THE REPUBLIC OF TAJIKISTAN'S NEEDS FOR TRAINING OF SPECIALIST IN THE FIELD OF PHYSICAL PROTECTION, ACCOUNTING AND CONTROL OF NUCLEAR MATERIALS

TURONSHO KHIKMATOV
Senior Engineer of the Department of Information and International Relations,
Nuclear and Radiation Safety Agency of the Academy of Sciences of Tajikistan

Republic of Tajikistan is situated between 36'40" and 41'05" of the northern latitude and 67'31 "and 75'14" of the eastern longitude. It occupies 143,1 thousand square km of territory and is located approximately on the same latitude as Greece, and the southern regions of Italy and Spain.

It should be mentioned that the Republic of Tajikistan, regardless of her small territory, has particular geopolitical location, as neighbors of Tajikistan are such countries as Afghanistan, other Central Asian Republics and she is located near such nuclear states as China, India, and Pakistan. Small Tajikistan has many kilometers of frontier with China and Afghanistan. And some areas of frontier are very hard to protect.

What is present situation in Tajikistan?Having gained independence, the Republic of Tajikistan was involved in inter-Tajik conflict, which turned into Civil war (1992-1997). Many specialists, who worked in the field of nuclear technology, have left Tajikistan during this period (mostly in plants of Tajikistan worked the outside experts). Part of them has left their jobs because of low salary. So, today we have considerable lack of well-educated specialists in this field, including physical protection, control and accounting of nuclear material.

The Civil War stopped for several years the process of monitoring of radiation sources in our country. After the Civil War we start to recover these services. But this recovery is very slow, because there is a lack of financing, lack of qualified personnel and equipment (dosimeters, spectrometers, calibration laboratory, modern computers, etc.).

There are no nuclear reactors in Tajikistan. But we have large amounts of radioactive wastes and radioactive sources, which are widely used in medicine, science and industry.

The amount of accumulated (remediated and active) "tails" for present period is more than 210 million of tons. They are stored in the area of more than a thousand hectares, which belong to the Republican Waste Repository Site and State Enterprise "Vostokredmet". Most of "tails" do not have proper cover and are very dangerous for the environment. These organizations have need sharply in professional experts, particularly, in the field of control, physical protection and accounting of nuclear materials.

System for control, monitoring, storage and protection of radioactive materials, which existed during the USSR period, has disintegrated since her Republics became independent states.

Tajikistan became the Member State of IAEA in 2001. The Minister of Foreign Affairs of Tajikistan has signed the Safeguards Agreement and Protocols Additional to the Safeguards Agreement.

The Nuclear and Radiation Safety Agency is established at the framework of the Academy of Sciences. The Agency is the Regulatory Authority of the Republic of Tajikistan on Problems of Safety, Control, Storage, and Utilization of Radioactive Materials. It was established in the January of 2003 and it is responsible for regulation, coordination and control of the work of all departments whose activities have relation to radioactive materials.

To solve the actual and urgent problems, which it faces the Nuclear and Radiation Safety Agency of the Republic of Tajikistan needs new contemporary equipment (radiometers, dosimeters, spectrometers, etc.), training of young well-educated specialists, and creation of conditions for carrying out of monitoring of the whole territory of Tajikistan. The most important of them is training of well-educated, professional personnel in the field of regulation, physical protection, and accounting of nuclear material on the national level.With the aim to have proper accounting of radioactive sources, by the proposal of the Agency, the Commission for Carrying Inventory of Radioactive Sources was established at the Government of the Republic of Tajikistan. All ministries and organizations, which use radioactive sources, should carry out inventory till the end of the 2003. We plan to create the State United Database for Sources of Ionizing Radiation

after the inventory will be finished. Thus, we shall be able to organize the control of radioactive sources “since cradle till tomb”. We are organizing office-work on accounting of sources of ionizing radiation, starting from acquirement, use and delivery to repository sites, i.e. we shall create a register for all operations with sources of ionizing radiation.The primary objectives of the Republic of Tajikistan are to enhance:

- First, the control that the country has over its holdings of nuclear material so it is less vulnerable to theft and/or misuse by individuals or groups;
- And second, the effectiveness and efficiency of international safeguards applied by the IAEA in Tajikistan.

The peaceful use of nuclear material and nuclear energy has done much to improve people’s life, providing energy and supporting advances in medicine and agriculture. The destructive potential of nuclear energy, in the wrong hands, could put at risk the lives of millions. It is our responsibility to ensure that this risk is not realized.

The IAEA relies on state systems to ensure that nuclear material is not diverted. These safeguards could not function effectively without the foundation of strong State Systems of Accounting and Control and strong physical protection system. The more reliable the state system, the more effective IAEA safeguards can be.

What are our conclusions?

Republic of Tajikistan, as well as many of the former Soviet Union Republics, has a lot of difficulties with physical protection and accounting of nuclear and radioactive materials. She has problems with staffing and training of its facilities as well. We do not have young, well-educated specialists in the field of physical protection of radioactive sources and their control and accounting. The older specialists, who were trained during the Soviet period do not meet contemporary world standards and need some training as well. Thus, all our specialists for physical protection of nuclear material and its accounting and control must undergo intensive training according to the modern international standards. Today it is difficult to find any well-educated specialist in these fields, as young people prefer other disciplines to nuclear physics. But still we have enthusiasts, who love Nuclear Physics, whom we should train.

The State system of MCNA and physical protection in Uzbekistan

A.Rahimbajev, H. Halilov

In accordance with the Non-proliferation agreement ratified by Uzbekistan in 1994 all the NM available in Uzbekistan are under the IAEA safeguards that requires" ... the establishing of the state MCNA system for NM , that are under the IAEA safeguards the agreement accordingly..."

The national Inspection on the atomic supervision, hereinafter Atomnadzor, with the Sanoatkontehnazorat Agency, was founded in 1994 after the USSR collapse. One of The obligations for Atomnadzor: to expand safeguards over all NM of civil application. Main functions: supervision over safe manufacturing and use of radioactive materials; following of rules and regulations on nuclear and radiation related safety; supervision on safeguards following of nuclear technologies, NM non-proliferation and their PP.

Uzbekistan was one of the first that joined the International conventions in 1998, on December 17 the Government has signed the Additional protocol to the IAEA agreement on safeguards. Measures to enhance safeguards will enhance safeguards fulfillment in our republic as well as in other states that have signed the Protocol. The Protocol signing is an evidence of the strict fulfillment by Uzbekistan its obligations to global non-proliferation of nuclear weapons.

Having become the IAEA member since 1994 Uzbekistan has launched the development of its own nuclear legislation to meet European standards. The Atomnadzor staff were participating in development of "Law on radiation related safety". This Law contains the close 22 that regulates the MCNA issues.
The legal ground for the State system of physical protection (SSPP) is the Non-proliferation Agreement and the Safeguards Agreement. The MCNA measures are applicable for all categories of NM available in Uzbekistan for peaceful use as well as for their importing process.
The State technical supervisory body was appointed by the Cabinet of Ministers decree to found the state MCNA system .
There was no own MCNA system available in Uzbekistan at the moment of the Non- proliferation Agreement signing. The MCNA activity was performed back than by the accounting and control department of the industry. The department was not dealing with the data processing, reporting procedures, independent measurements conducting, data coding. Concurrently with the MCNA system foundation we were dealing with the establishing and developing of the State supervision procedures over the use of the nuclear energy. First of all that was the need to upgrade the nuclear and radiation related safety structure.
The operators that obtained permission to carry on activities like use, storage, transportation of fission materials are responsible for MCNA in the direct balance zones.
the facilities and NM of Uzbekistan are all under the IAEA safeguards. The reporting is being performed by the operator using special software. The Sanoatkontehnazorat Agency processes the information submitted in electronic of hard copies in computer, combines with the previous reports and the inspections outcomes and submits the final stuff to the IAEA. In case of incompliances the investigation is being initiated.
In June 1995 the group of the US, Great Britain, Sweden, Finland, and Australia experts under the auspice of the IAEA arrived to Uzbekistan to assess the needs in MCNA and PP. The Sweden and Australia provided assistance in MCNA area, USA and Great Britain - to upgrade the PP system.
Since August 1995 the republic began to develop PP of NM and NF (PPNM). With the assistance of donor countries the PPNM of the Nuclear physics institute was founded. The original software is being used in this PPNM. The institute operators that were trained in various IAEA courses operate this system. The PP of NM and NF is being performed by the interior troops. PP system consists of 4 stages: barrier-assess control; warning system - protected communication systems.

Nowadays we are facing problems in PP operation, maintenance, operators training, security staff and their certifying. Problems with information storage and processing means; lack of PCs with big memory and measurement means (portable multichannel analyzers). There is also a need to additionally train inspectors, experts for gain and implement other countries experiences in same area.

We believe the Sanoatkontehnazorat Agency will fulfill all international recommendation to strength the control over use of nuclear and radioactive materials, its export-import transportation.

Presentation on the physical protection of VVR – CM reactor

A.Rahimbajev, PP Head of the VVR-CM reactor

With the American assistance and the Provision "On PP of nuclear materials" accordingly was done:

- inside the main premises the new fresh fuel storage was constructed by the principle "voult " and properly equipped.
- The reinforced secured central PP board was constructed that enables the staff to survey and record on video tape everything happening in the restricted zone, its entrances, to detect an intruder by the alarm signals
- The coded pass - cards system for the staff that has assess was implemented

All these works were completed and turned into operation in 1996.
Due to the unstable political situation in the neighboring Afghanistan and Tajikistan, or terrorists actions (like one that has happened in Tashkent February 16, 1999) the need still remains to reinforce and upgrade the PP, safe storage of spent and fresh fuel.
The Agreement " On collaboration between USA and Uzbekistan in defense sphere and nuclear fuel non-proliferation" was signed July 5, 2001.
The range of the projects were implemented that were considered as a second stage of the reactor PP strengthening.
As a part of above project activities: the double fence, assess control point with compartment for the vehicles check were built; computers were replaced, new video surveillance equipment installed. Additional perimeter security means installed, assess control to the reactor building through the portal and on the perimeter.
The perimeter security system is based on the INTREPID vibration sensor equipped with the sensitive cable installed on the special alarm

fence. The INTREPID system is equipped with processor and switcher modules, own software, that can adjust each detector up to 1 meter. The INTREPID is installed on the one main board computers that is connected to the detector processor. This computers monitor reflects an approximate scheme of the area and red flashing light detects an alarm signal, connected to the "problematic" piece of the fence with 1 meter accuracy .
Perimeter is divided for pieces which send their signals to the main board in assess control room reflected on Central board monitor. The monitors switch the corresponding cameras on the alarm signal and the recorder starts recording with the 5 min prehistory.
Two digital video recorders on 24 hours.
The following works were also completed in a frames of the projects:

- assess control area (ACA) was equipped with the video surveillance equipment, the loud speakers installed in ACA and Central control board
- all wooden doors replaced with metal ones
- magnet cards sensors at reactor building and at ACA replaced with the contactless cards sensors Proximity alike
- the pass cards office organized
- 3 anti - ramming metal ropes
- windows of the main reactor hall covered with metal sheets on both sides

There are 6 security levels available on reactor and is being secured by the interior troops response teams. Assess to the secured area and internal zones as well as the number of entrances is limited down to the minimal number.
Having all the above done we now have reinforced assess control with the "trap" – compartment for personnel. Personel moves through the "trap"-compartment equipped with the metal detector and hand detector of NM. Passing through the assess control point personnel shows the passcards and is being detected for prohibited, explosive and redioactive substances.
Incoming and outgoing vehicles are being detected inside compartment foe explosive and radioactive substances. The vehicle driver is being checked too. Private vehicles are strictly prohibited to enter the restricted zone. Response teams and PP operators interact closely. in case of troubles on perimeter operator informs the guards using intercom system. Perimeter is being seen both o monitors in ACA. The secured area is being patrolled at nighttime.
The physical protection system is operated by the civil personnel from the reactor staff. there are 14 operators and 2 technicians, operators work around the clock.

PP personnel deals also with functional testing of the ACA and alarm response , etc.
According to the procedure the PP staff are advancely trained. For instance 3 experts attended the advanced training in ANL, USA in 2002; two experts – in Obninsk, Russia this year(IAEA courses).
The PP equipment was installed on gamma-rays facilities and isotopes storage at the Institute territory in collaboration with DOE, USA. The PP system was installed and turned into operation by the PP personnel. All signals from above premises go to Central Control board of PP of reactor.
The above achievements irrespective there are still some issues remaining:

- development of requirements towards PP system, clearance and assess procedures
- PP staff training (involving experts from the Moscow ADVANTOR office) to operate INTREPID vibration equipment
- Necessary installation and settle of engineering-technical part of security. Operation, maintenance and technical support
- Maintenance of equipment of the passcards office (instructors training)
- Software provision, system administration and transfer for other operation system
- Plans development for emergency cases including interactions with relative agencies

To address the above issues we need to train instructors, availability of training and presentation materials and proper equipment

Appendix C.6. NIS/Baltics Training Needs Assessment Workshop Protocol

The NIS and Baltic States Workshop on Assessment of Needs for Physical Protection and Nuclear Material Accounting and Control Specialists Training held at George Kuzmycz Training Center
January 28-30, 2004

The participants to the workshop consider the training of physical protection and nuclear materials/ nuclear facilities accounting and control specialists for NIS and Baltic States an important task which implementation will make it possible to elevate the organization of the said work to a new quality level.

The GKTC has conducted a great deal of work in order to collect and analyze the information pertaining to individual countries training needs and relating these needs to the organization of the workshop.

It should be noted that the systems of physical protection, that of nuclear materials and facilities accounting and control are different from country to country. This notwithstanding, there are commonly shared outstanding problems that need to be resolved.

Based on the presentations and discussions at the workshop, the participants hereby make the proposals in relation to the training and education of physical protection and nuclear material accounting and control as follows:

1. Organization and training of instructors for the purpose of further training of middle and lower level personnel locally. Advanced training of managerial personnel of the regulatory and state governance bodies as well as that of the facilities.

2. Listed below are the priority areas for training of specialists:

- Crisis Situation Management
- Design Threat Definition
- Guard force officer training
- Fundamentals of Physical Protection
- Operation and Technical Support of Physical Protection Systems
- Fundamentals of Nuclear Material Accounting and Control
- Nuclear Material Non Destructive Analysis Methods
- Training of Regulatory Agency Inspectors

3. Provide provisions of basic training and presentation material for setting up and outfitting training classes at the facilities in individual countries.

4. In order to increase the effectiveness of the training process, the participants to the workshop from the Central Asia region consider it advisable to set up a training center in the region to organize and conduct physical protection and nuclear materials accounting and control training courses.

Organization of specialist training in physical protection and nuclear materials accounting and control will make it possible to improve protection of nuclear materials in the NIS and Baltic States and contribute to the non proliferation of nuclear weapons.

This Protocol was signed by the countries listed below:

Republic of Azerbaijan
Republic of Armenia
Republic of Belarus
Republic of Georgia
Republic of Kyrgyzstan
Republic of Latvia
Republic of Lithuania
Republic of Tajikistan
Republic of Uzbekistan

(Republic of Kazakhstan did not sign)

Appendix D. Development of MPC&A Training Course List and Training Course Summary for Ukraine and NIS/Baltics Countries

- **Ukraine PPS course needs summary** D-2
  - List of NM PP training courses D-3
  - Categories of specialists on PP of NM and NF.....D-9
  - List of lectures for each category of specialists.....D-9
  - List of prospective students from each [Ukrainian] facility.....D-13
  - Training courses topics analysis for the availability of training materials in GKTC.....D-22
- **Reports on discussions with Zaporozhye Nuclear Power Plant and Yuzhnoukrainsk (South Ukraine) Nuclear Power Plant personnel** D-25
  - [ZNPP visit].....D-25
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- **NIS/Baltics common PPS course needs summary** D-29
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- **MC&A course lists for Ukraine and for NIS/Baltics**.....D-33
  - List of MC&A training courses… [developed to meet Ukrainian needs] D-33
  - List of prospective [Ukrainian] students, by facility, for MC&A courses D-38
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  - List of prospective NIS/Baltics students, by country, for MC&A courses D-44

In accordance with the Contract # 269936 with Sandia National Laboratories, DOE, USA, GKTC developed the list consisted of 19 topics of training courses on physical protection of nuclear material and nuclear facilities for improving Ukrainian PP specialists qualification. The draft of that list given in Table 1 was sent for reviewing to all nuclear fasilities of Ukraine (Chernobyl NPP, Khmelnitsky NPP, Zaporizhie NPP, South Ukrainian NPP, Rivne NPP, Sebastopol Institute, Kharkiv Institute, KINR), to NAEC "Energoatom", State Nuclear Regulatory Committee of Ukraine, Ministry of Fuel and Energy, Security Service of Ukraine. [NOTE: See Table 3 (D-3) and Table 2 (D-13) for the course listing.]

Table 1. List of Training courses on PP of nuclear material and nuclear facility

No	Name of a course and its abstract	Recommendations and remarks to content of a course	Number of persons who need training			
			instructors	managers	Technical personnel	
					Engineers	technicians

Regulatory Committee, control body, all nuclear operators sent their remarks on the proposed list of training courses and lists of listeners proposed for each training course as well. (Table 2).
Also GKTC representatives visited 2 nuclear sites of Ukraine – South Ukrainian NPP and Zaporizhie NPP. At the meetings with PP personnel of these sites the following issues were discussed:

1. Final approval of proposed training courses and its contents.
2. Discussions of proposals on the format of training.
3. Comments to categorization of NPP PPS personnel.
4. Determination of the scope of training material and duration of training courses for students of different categories.
5. Search of specialists who can be involved in development of training materials for the courses.
6. Estimation the possibility to conduct some of the courses directly at NPP site.
7. Questions of training the instructors on PP for sites:
    a. What categories of PP specialists could be trained directly at site,
    b. What is necessary for organization of such training at site.

Reports on the visits to NPPs are attached.
Proposed list of courses was approved in general by all nuclear operators, regulatory and control bodies of Ukraine.
Among received remarks and recommendations it's necessary to mention the following:

- Nuclear facilities representatives remarked that it is necessary to implement systematic approach to training of PP specialists;
- Under development of the course to give attention to specific national problems and consider the issues of interaction of physical protection with nuclear and radiation safety, fire and technical safety;
- To involve more practical issues related to concrete problems of nuclear facilities;
- Because of increasing terrorists activity to give more attention to the questions of rational arrangement of response forces, as well as to guards forces role in organization of physical protection at NPP;
- To deliver the brief "Basic course on MC&A" for personnel of PP divisions of NPPs.

- To develop a course “Organization of PP system during decommissioning of nuclear installation”.

GKTC revised the list of training courses, made necessary amendments and, taking into account the importance for Ukraine of the topic “Organization of PP system during decommissioning of nuclear installation” added this topic to the List. Final version of the List of Training Courses on PP of NM and NF with its abstracts is given in Table 3.

Table 3. LIST OF NM PP TRAINING COURSES

#	Training Course	Category of trainees	Data / duration
1	**Fundamentals of Physical Protection** – Physical safety and physical protection – Physical protection system – Nuclear material and nuclear facilities, potential threat, what they do represent – Nuclear weapons; nuclear explosive devices; radiological weapon; radiological dispersal device – Hypothetical nuclear facility – Ukrainian legal basis in the field of physical protection of nuclear facilities and nuclear material; Ukrainian laws, regulations of Ministry, rules and standards – Design basis threat – PP procedures including action plan in a case of emergency – Guards as a part of PPS – PPS design fundamentals – PPS technical devices – Assembling, and setting of PP technical devices – Trial implementation of PP technical devices – Performance testing of PPS, its subsystems and solitary components – Vulnerability Assessment of PPS – Correction measures – PPS setting into operation and its operation – Quality assurance issues in the field of PP – Role of the regulatory body in providing for PP of NM and NF. Licensing and inspection of PPS of NF by oversight body and PPS verification by control body – IPPAS mission – Duties of NF management, operational organization and control body, that deal with providing for PP during the life cycle of NF	1,2,3a,3b,4a,4b, 4c,4d, 5	2004 40h
2	**Legislative framework on physical protection** – IAEA documents which are related to international regime of providing for PP of NM and NF – Legislative acts regulating PP issues in the field of nuclear energy use – Decrees of the President of Ukraine – Normative acts of Ministry regulating special issues related to providing for PP of NM and NF – Departmental normative acts	1, 3b, 4a, 4b, 5, 6a	2005 40h

	– The main concepts of regulation in the field of PP (regulation, licensing, supervision/inspection) – Further improvement of legal basis in the field of PP (DBT development, codification of nuclear legislation etc.)		
3	**Design of physical security means of NM, NF, and information protection** – Engineering means: - fence; - constructive elements of buildings and construction; - engineered barriers; - artificial cover; – Automated complex of physical security means: - intrusion detection system; - entry/exit control; - video surveillance system; - alarm communication and display; – Information characteristic and requirements to information protection system - Basic principles of information protection - Modeling of information protection system - Procedural and technical means of information protection - Development or modernization of information protection system - Support of information protection system of computer systems and communication links taking into account the changing threats of security means spoof	2, 3a, 4a, 4b, 6b	2005 80h
4	**Physical Protection System Designing** – PPS functions – General principles of PPS design – PPS engineering process – Analysis and Evaluation of PPS Design – Design approval	1	2005 40h
5	**Security System Analysis and Modeling** – Hypothetical Facility – Goals and objects of PP – PPS Design Assurance – The main principles of engineering process – Design analysis – Design evaluation	2, 3a, 4d, 5, 6b	2005 80h
6	**Vital Area Identification** – Facility characterization – Design basic threat – Vital area identification – Stages of vital area analysis – Mathematical tool of vital area analysis – PPS vulnerability analysis – Work with SAPHAIRE software	2, 3a, 3b, 4d, 6b	2005 80h
7	**PP Vulnerability Assessment including transportation of nuclear material**	1, 2, 3a, 3b, 4d, 5, 6b	2006

	– Legal basis in the field of physical protection – Goals and objects of PPS – Threat definition (outsider and insider) – Target identification (theft, sabotage) – Development of intruder tactics and strategy – Physical protection system evaluation concerning threat – Detection of points of PPS vulnerability – Compensative and correction measures – Specialties of transportation vulnerability assessment (specificity of threat definition, increasing of guards role, level of action co-ordination with regional authority, effectiveness of procedures of transportation security including procedures under emergencies)		80h
8	**Introduction to performance testing of physical protection systems** – Classification and functions of physical security means – Role of physical security means in PPS effectiveness assurance – Goals and objects of physical security means testing – Methodology of physical security means testing conducting – Personnel and means of testing conducting – Definition of degree of testing – Planning and organization of testing conducting on specific nuclear facility – Development and taking a compensative PP measures during testing conducting – Testing conducting – Analysis of results of testing conducting, closing of documents – Modernization of physical security means with regard to testing results	2, 3a, 4a, 4d, 6b	2006 80h
9	**PP management at normal operation and in emergencies** – Responsible person for NF PPS state – Organization of subdivision of physical safety or physical security – Development of PP procedures including procedures of access and security clearance – Development and setting into operation of system and means of NF security (act of inter-departmental commission) – Interaction plan under emergency – Organization of instruction of PP subdivision personnel and facility personnel on PP issues – Conducting of training with participation of PP subdivision personnel, facility personnel, and guard force personnel – Operational tests of PPS technical devices and efficiency verification of PP procedures – Financing maintenance and logistic support of NF PPS – Effectiveness testing of interaction plan under theft of nuclear material or sabotage – Conducting of joint trainings – Particularities of NF PP management under emergencies: natural disasters, radiological accident, act of nuclear terrorism – PPS management of nuclear facility during period of recovery	1, 3b, 5, 6a	2006 80h
10	**Security System Fundamentals for Guard officers and**	6a, 6b	2006

	response force personnel. – Security system fundamentals – Legal basis of PP in Ukraine – regulatory requirements – Facility characterization – Threat definition – Target identification – Intrusion detection system – Alarm assessment – Alarm communication and display – Entry/exit control – Delay systems – Response – Vulnerability assessment during life cycle – Corrective measures		40h
11	**Inspection of physical protection system operation** – Legal acts requirements to PP of NM and NF – Interdependence of control, licensing, and supervision as a function of state regulation of NM and NF physical protection – Goals and objectives of inspection of PPS operation – Procedures of inspection activity; types of inspections – Rights and duties of state inspectors – Rights and duties of nuclear facilities and operating organizations under inspection – Planning and preparing of inspections – Conducting of inspections – Drawing up of results of inspection, prescriptive notes and sanctions of supervision authority – Procedure of information submission on an actual condition of physical protection of nuclear facility to concerned state authorities	5	2006 80h
12	**Support of Design Basic Threat under State and facility levels**. – The role of DBT in PP. DBT – basis of PP creation and modernization both on state and site levels. – Risk evaluation – Information sources for DBT – Regulatory requirements to DBT – Updating of DBT. The main principles of DBT updating. – Possible ways of approach revision	3b, 4b, 5, 6a	2006 40h
13	**Modern means of physical protection.** - The role of modern physical security means for providing of NM and NF physical protection – Modern guided barriers – The latest achievements in the field of creation and application of intrusion detection sensors – Capabilities of modern digital video surveillance and assessment systems – Modern Central alarm station – Automated access control system – Devices for indicating of tampering into the physical security means operation – Modern means of NM security confirmation – Devices for reliable protected communication	2, 3a, 4b, 6b	2007 40h

	– Means and systems of information protection with limited access including computer protection – Modern equipment for detection of nuclear materials, metals, and explosive smuggling – Modern guard force equipment and arms including non-lethal influence means on adversary		
14	**Maintenance and repair of engineered and technical means of security** – General conditions – Requirements to organizations which carry out building and assembly jobs – Requirements to design estimates – Equipment integration – Manufacturing of building and assembly jobs – PP technical device putting into operation	3a, 4b, 6b	2007 40h
15	**Control of operation of guard and response forces in emergencies at nuclear facility** – State legal acts in the field of NM and NF PP and struggle against terrorism – Distribution of responsibilities and authorities between nuclear facility management and guards headquarters – Interaction plan under emergencies including case of nuclear terrorism – Development of action scenario and guards training for emergency operations – Conducting of joint exercise of guards force, personnel of NF PP subdivisions and outside help forces with participation of representatives of other state and regional authorities mentioned in interaction plans – Emergency at nuclear facility (nuclear material theft, capture of hostages, attempt/execution of act of terrorism) – Consummation of interaction plan under emergency – Creation of united response command – Cooperation of united command with facility management, state and regional authorities – Headquarters actions during emergency resolution in a case of: NM theft, taking a hostages, attempt and act of terrorism – Response action conducting during recovery	3b, 6a	2007 40h
16	**Development of procedures on physical protection at facility including special verification procedures and clearance.** – Legal acts requirements to PP of NF and NM – Modern approaches to PP procedures development – Methodology of PP procedures development – PP procedures development for concrete nuclear facility – Agreement and consummation of PP procedures including personnel familiarization with their content – Necessity of PP procedures performance for NF management and personnel – Continual control of procedures efficiency, procedures correction with the object of elimination of revealed defects, or increase of procedures efficiency	3b, 4b, 6a	2007 40h

	– Making changes in procedures in view of alterations of legal acts requirements		
17	– **Designing, installation, adjustment, operation and maintenance service of physical security means (the course is developed for each concrete case, depending on equipment which is installed).** – Requirements to physical security means – Certification of physical security means – Observance of legal act regulations in the field of PP at designing of NF physical security means – Design modeling and analysis – *Testing of physical security means components for adequacy of its real characteristics to the certificate* – Design acceptance – Requirements to assembling and adjustment of physical security means; access procedure for engineers, technicians, and workers from other organizations including foreign specialists to assembling and adjustment work – Functional performance testing of mounted and adjusted physical security means – Procedures of physical security means commissioning – Availability assurance of physical security equipment as a part of PPS during operation	2, 3a	2007 80h
18	**Licensing of PPS for nuclear materials and nuclear facilities.** – Requirements of law and state legal acts to PP of nuclear facilities at all stages of life cycle – Licensing – a function of state regulation in the field of nuclear energy use – Modern approaches to licensing of PP – Establishment of PP in compliance with the requirements of legal acts is one of the conditions to obtain license or permit operation in the field of nuclear energy – Duties and rights of applicant to obtain a license – Procedure and forms of documents to be submitted for license obtaining in the field of nuclear energy use (only in the field of PP) – Procedure of licensing (only procedures relating to PP) and license issuance – Licensee responsibility for PP of nuclear material, nuclear facility, and radioactive wastes - Supervision over Licensee's observance of license conditions relating to PP	1, 5	2007 40h
19	**PPS organization at decommissioning stage of nuclear facility** - Legal requirements in Ukraine to PP of nuclear facility at closure and decommissioning stage - The needs of PP to be reflected in the license package of documents for obtaining a license for closure and decommissioning of NF - Development of PP plan for nuclear facility at the stage of closure and decommissioning	1, 2, 3a, 3b, 5, 6a, 6b	2007 40h

	- Development and approval of interaction plan at emergencies caused by nuclear terrorism acts - Verification of compliance of existing PP system efficiency and availability to the requirements of PP Plan of nuclear facility at the stage of closure and decommissioning - Corrective and compensative measures of Pp - Guard's role in PP assurance at closure and decommissioning stages - Change of PP levels and specific components as far as nuclear material is removed from the installation		

Agreed topics for training courses are assessed with regard to availability of training material in GKTC. The results are presented in Table 4.

Based on discussions with representatives of nuclear facilities, regulatory and control bodies and aiming to provide for systematic approach to improving of PP personnel skills we decided to categorize them as follows:

CATEGORIES OF SPECIALISTS ON PP OF NM AND NF.

Category 1. Managers of nuclear facilities on PP (Director, Chief Engineer, Deputy Chief Engineer on Safety, Head of PP Division) – top level;
Category 2. Nuclear Facilities Shift Supervisors on PP, Heads of groups, PP control panel engineers-operators – intermediate level;
Category 3. Engineers and technicians of nuclear installations – lower level:
3a – engineers on maintenance and support of PP system operation (in accordance with procedure);
3b – engineers of internal security group;

Category 4. Instructors
4a – on basic PP.
4b – on assembling, adjustment, operation and maintenance of PP system.
4c – on development of regime procedures of PP.
4d – on assessment of PP system effectiveness and efficiency.
Category 5. Staff of regulatory and control bodies on PP.
Category 6. Military and security forces involved into PP of NM and NF.
6a –Officers.
6b – Technical staff.

Out of 19 topics of the courses specific list of topics is developed for each category, taking into account functions of the employees belonged to a category.

Lists of lectures for each category of specialists (in accordance with their functions)

List 1. ***For category 1***

1.1. Fundamentals of Physical Protection
1.2. Legislative framework on physical protection

1.3. Physical Protection System Design Overview
1.4. PP Vulnerability Assessment including transportation of nuclear material
1.5. PP management at normal operation and in emergencies
1.6. Licensing of nuclear material and nuclear facility PPS.
1.7. PPS organization at decommissioning stage of nuclear facility

List 2. For Category 2.

2.1. Fundamentals of Physical Protection
2.2. Technical means of NM, NF physical protection, including information protection
2.3. Security System Analysis and Modeling
2.4. Vital Area Identification
2.5. PPS Vulnerability Assessment including transportation of nuclear material
2.6. Introduction to performance testing of physical protection systems
2.7. Modern means of physical protection.
2.8. PPS organization at decommissioning stage of nuclear facility
Additional training course (the course is developed for each specific case, depending on the manufacturer of equipment installed)
Designing, installation, adjustment, operation and maintenance service of physical security means

List 3a. For Category 3a.

3A.1. Fundamentals of Physical Protection
3A.2. Technical means of NM, NF physical protection, including information protection
3A.3. Security System Analysis and Modeling
3A.4. Vital Area Identification
3A.5. PPS Vulnerability Assessment including transportation of nuclear material
3A.6. Introduction to performance testing of physical protection systems
3A.7. Modern means of physical protection.
3A.8. Assembling, adjustment and operation of technical means of security
3A.9. PPS organization at decommissioning stage of nuclear facility
Additional training course (the course is developed for each specific case, depending on the manufacturer of equipment installed)
Designing, installation, adjustment, operation and maintenance service of physical security means

List 3B. For Category 3b

3B.1. Fundamentals of Physical Protection
3B.2. Legislative framework on physical protection
3B.3. Vital Area Identification
3B.4. PPS Vulnerability Assessment including transportation of nuclear material
3B.5. PP management during normal operation and in emergencies
3B.6. Support of Design Basic Threat under State and facility levels.
3B.7. Management of guard forces during normal operation of facility and in emergencies
3B.8. Development of procedures on physical protection at facility, including special verification procedures and clearance.
3B.9. PPS organization at decommissioning stage of nuclear facility

List 4. For Category 4a.

4A.1. Fundamentals of Physical Protection
4A.2. Legislative framework on physical protection
4A.3. Technical means of NM, NF physical protection, including information protection
4A.4. Introduction to performance testing of physical protection systems

List 4B. For Category 4B

4B.1. Fundamentals of Physical Protection
4B.2. Technical means of NM, NF physical protection, including information protection
4B.3. Modern means of physical protection.
4B.4. Assembling, adjustment and operation of technical means of security

List 4C. For Category 4C.

4C.1. Fundamentals of Physical Protection
4C.2. Legislative framework on physical protection
4C.3. Support of Design Basic Threat under State and facility levels.
4C.4. Development of procedures on physical protection at facility, including special verification procedures and clearance.

List 4D. For Category 4D.

4D.1. Fundamentals of Physical Protection
4D.2. Security System Analysis and Modeling
4D.3. Vital Area Identification
4D.4. PPS Vulnerability Assessment including transportation of nuclear material
4D.5. Introduction to performance testing of physical protection systems

List 5. For Category 5.

5.1. Fundamentals of Physical Protection
5.2. Legislative framework on physical protection
5.3. Security System Analysis and Modeling
5.4. PP Vulnerability Assessment including transportation of nuclear material
5.5. PP management at normal operation and in emergencies
5.6. Inspection of physical protection system operation
5.7. Support of Design Basic Threat at State and facility levels.
5.8. Licensing of PPS for nuclear materials and nuclear facilities.
5.9. PPS organization at decommissioning stage of nuclear facility

List 6A. For Category 6a

6A.1. Security System Fundamentals for Guard officers and Response Force Personnel
6A.2. Legislative framework on physical protection
6A.3. PP management at normal operation and in emergencies
6A.4. Support of Design Basic Threat under State and facility levels.
6A.5. Management of guard forces during normal operation of facility and in emergencies

6A.6. Development of procedures on physical protection at facility, including special verification procedures and clearance.
6A.7. PPS organization at decommissioning stage of nuclear facility

List 6B. For Category 6b.

6B.1. Security System Fundamentals for Protective Force Personnel
6B.2. Technical means of NM, NF physical protection, including information protection
6B.3. Security System Analysis and Modeling
6B.4. Vital Area Identification
6B.5. PP Vulnerability Assessment including transportation of nuclear material
6B.6. Introduction to performance testing of physical protection systems
6B.7. Modern means of physical protection.
6B.8. PPS organization at decommissioning stage of nuclear facility

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Table 2. List of prospective students from each facility

#	Title	Data/ Duration	Facility	Total	Number of students for each course			
					Instructors	Managers	Engineers	Technicians
1	Fundamentals of Physical Protection	2004 40h	Chornobyl NPP	21	4	1	16	
			Khmelnitski NPP	14	4		10	
			Zaporozhye NPP	13	4	6	3	
			South-Ukrainian NPP	5	4	1		
			Rivno NPP	20	4		16	
			Sevastopol INE&I	4	2	2		
			Kharkov IPh&T	8	2	2	4	
			KINR	3		1	2	
			Ministry of Fuel and Energy	1			1	
			SNRC of Ukraine	3		1	2	
			Security service of Ukraine	3			3	
			NAEC “Energoatom”	5		1	4	
			Total sum	**100**	**24**	**15**	**61**	**0**
2	Normative-legal field and procedures of physical protection	2005 40h	Chornobyl NPP	4	2	1	1	
			Khmelnitski NPP	7	2		5	
			Zaporozhye NPP	3	2	1		
			South-Ukrainian NPP	3	2	1		
			Rivno NPP	4	2	2		
			Sevastopol INE&I	4	2	2		
			Kharkov IPh&T	3	1	2		
			KINR	2		1	1	
			Ministry of Fuel and Energy	2			2	
			SNRC of Ukraine	3		2	1	
			Security service of Ukraine	-				

			NAEC “Energoatom”	6		2	4	
			Total sum	**41**	**13**	**14**	**14**	**0**
3	Design of physical security means of NM, NF, and information	2005 40h	Chornobyl NPP	10	2	1	7	
			Khmelnitski NPP	6	2		4	
			Zaporozhye NPP	4	2		2	
			South-Ukrainian NPP	2	2			
			Rivno NPP	12	2		10	
			Sevastopol INE&I	5		2	3	
			Kharkov IPh&T	4	1	1	2	
			KINR	3			1	2
			Ministry of Fuel and Energy	2			2	
			SNRC of Ukraine	1			1	
			Security service of Ukraine	3		1	2	
			NAEC “Energoatom”	4		1	3	
			Total sum	**56**	**11**	**6**	**37**	**2**
4	Physical Protection System Design Overview	2005 40h	Chornobyl NPP	2			2	
			Khmelnitski NPP	2			2	
			Zaporozhye NPP	-				
			South-Ukrainian NPP	-				
			Rivno NPP	2		2		
			Sevastopol INE&I	4	2	2		
			Kharkov IPh&T	4	1	2	1	
			KINR	1			1	
			Ministry of Fuel and Energy	2			2	
			SNRC of Ukraine	1			1	
			Security service of Ukraine	-				
			NAEC “Energoatom”	2			2	
			Total sum	**20**	**3**	**6**	**11**	**0**

5	Security System Analysis and Modeling	2005 80h	Chornobyl NPP	2	1		1	
			Khmelnitski NPP	3	1		2	
			Zaporozhye NPP	1	1			
			South-Ukrainian NPP	1	1			
			Rivno NPP	1	1	-	-	-
			Sevastopol INE&I	4	2	2		
			Kharkov IPh&T	4	2	2		
			KINR	3		1	2	
			Ministry of Fuel and Energy	2			2	
			SNRC of Ukraine	2			2	
			Security service of Ukraine	-				
			NAEC “Energoatom”	2			2	
			Total sum	**25**	**9**	**5**	**11**	
6	Vital Area Identification	2005 80h	Chornobyl NPP	3	1	1	1	
			Khmelnitski NPP	4	1		3	
			Zaporozhye NPP	2	1	1		
			South-Ukrainian NPP	6	1		5	
			Rivno NPP	15	1		14	
			Sevastopol INE&I	4	2	2		
			Kharkov IPh&T	4	2	2		
			KINR	2		1	1	
			Ministry of Fuel and Energy	3		1	2	
			SNRC of Ukraine	1			1	
			Security service of Ukraine	3		3		
			NAEC “Energoatom”	2			2	
			Total sum	**49**	**9**	**11**	**29**	
7	PP Vulnerability Assessment including transportation of	2006	Chornobyl NPP	7	1	4	2	
			Khmelnitski NPP	6	2	2	2	

	nuclear material	80h	Zaporozhye NPP	1	1			
			South-Ukrainian NPP	1	1		1	
			Rivno NPP	15	1		14	
			Sevastopol INE&I	4	2	2		
			Kharkov IPh&T	4	2	2		
			KINR	2		1	1	
			Ministry of Fuel and Energy	2		1	1	
			SNRC of Ukraine	1			1	
			Security service of Ukraine	4		2	2	
			NAEC “Energoatom”	5		2	3	
			Total sum	**53**	**10**	**16**	**27**	
8	Introduction to performance testing of physical protection systems	2006 80h	Chornobyl NPP	10	2		8	
			Khmelnitski NPP	5	2		3	
			Zaporozhye NPP	2	2			
			South-Ukrainian NPP	3	2	1		
			Rivno NPP	2	2			
			Sevastopol INE&I	5		2	3	
			Kharkov IPh&T	7	1	2	4	
			KINR	3		1	1	1
			Ministry of Fuel and Energy	-				
			SNRC of Ukraine	-			-	
			Security service of Ukraine	-				
			NAEC “Energoatom”	4			4	
			Total sum	**41**	**11**	**6**	**23**	**1**
9	PP management on the state and facility level, during normal operation and in emergencies	2006 80h	Chornobyl NPP	5		4	1	
			Khmelnitski NPP	4	2	2		
			Zaporozhye NPP	2		2		
			South-Ukrainian NPP	1			1	

			Rivno NPP	2		2	-	
			Sevastopol INE&I	5	2	3		
			Kharkov IPh&T	9	2	3	4	
			KINR	4		2	2	
			Ministry of Fuel and Energy	3		2	1	
			SNRC of Ukraine	2		1	1	
			Security service of Ukraine	4		2	2	
			NAEC “Energoatom”	3		2	1	
			Total sum	**44**	**6**	**25**	**13**	
10	Security System Fundamentals for Protective Force Personnel	2006 40h	Chornobyl NPP	3		3		
			Khmelnitski NPP	-				
			Zaporozhye NPP	-				
			South-Ukrainian NPP	3		1	2	
			Rivno NPP	-			-	
			Sevastopol INE&I	4	2	2		
			Kharkov IPh&T	6	2	2	2	
			KINR	-				
			Ministry of Fuel and Energy	-				
			SNRC of Ukraine	-				
			Security service of Ukraine	-				
			NAEC “Energoatom”	1			1	
			Total sum	**17**	**4**	**7**	**5**	
11	Inspection of a condition of physical protection system	2006 80h	Chornobyl NPP	-				
			Khmelnitski NPP	2		2		
			Zaporozhye NPP	-				
			South-Ukrainian NPP	1		1		
			Rivno NPP	-			-	
			Sevastopol INE&I	2		2		

			Kharkov IPh&T	3	1	2		
			KINR	-				
			Ministry of Fuel and Energy	-				
			SNRC of Ukraine	3		2	1	
			Security service of Ukraine	4		2	2	
			NAEC “Energoatom”	1			1	
			Total sum	**16**	**1**	**11**	**4**	
12	Support of Design Basic Threat under State and facility levels.	2006 40h	Chornobyl NPP	2	1	1		
			Khmelnitski NPP	4	2	2		
			Zaporozhye NPP	3	1	1	1	
			South-Ukrainian NPP	2	1	1		
			Rivno NPP	4	1	3		
			Sevastopol INE&I	5	2	3		
			Kharkov IPh&T	2	1	1		
			KINR	2		1	1	
			Ministry of Fuel and Energy	3		2	1	
			SNRC of Ukraine	2		1	1	
			Security service of Ukraine	3		2	1	
			NAEC “Energoatom”	2		1	1	
			Total sum	**34**	**9**	**19**	**6**	
13	Modern means of physical protection	2007 40h	Chornobyl NPP	8	1		7	
			Khmelnitski NPP	7	1	2	4	
			Zaporozhye NPP	7	1		6	
			South-Ukrainian NPP	3	1		2	
			Rivno NPP	20	1		7	12
			Sevastopol INE&I	6		3	3	
			Kharkov IPh&T	8	2	2	4	
			KINR	2			1	1

			Ministry of Fuel and Energy	2			2	
			SNRC of Ukraine	1			1	
			Security service of Ukraine	-				
			NAEC “Energoatom”	4		1	3	
			Total sum	**68**	**7**	**8**	**40**	**13**
14	Maintenance and repair of engineered and technical means of security	2007 40h	Chornobyl NPP	8	2	1	5	
			Khmelnitski NPP	5	1		4	
			Zaporozhye NPP	1	1			
			South-Ukrainian NPP	2	1		1	
			Rivno NPP	1	1			
			Sevastopol INE&I	5		2	3	
			Kharkov IPh&T	4	1	3		
			KINR	2			1	1
			Ministry of Fuel and Energy	-				
			SNRC of Ukraine	-				
			Security service of Ukraine	-				
			NAEC “Energoatom”	2			2	
			Total sum	**30**	**7**	**6**	**16**	**1**
15	Management of a guards forces during normal operation of facility and in emergencies	2007 40h	Chornobyl NPP	4		4		
			Khmelnitski NPP	3	1	2		
			Zaporozhye NPP	2		2		
			South-Ukrainian NPP	1		1		
			Rivno NPP	7			7	
			Sevastopol INE&I	6	2	4		
			Kharkov IPh&T	5	2	3		
			KINR	2		2		
			Ministry of Fuel and Energy	4		2	2	
			SNRC of Ukraine	1			1	

			Security service of Ukraine	-				
			NAEC “Energoatom”	1		1		
			Total sum	**36**	**5**	**21**	**10**	
16	Development of procedures on physical protection on object	2007 40h	Chornobyl NPP	6	1	3	2	
			Khmelnitski NPP	4	1		2	1
			Zaporozhye NPP	2	1	1		
			South-Ukrainian NPP	4	1		1	2
			Rivno NPP	13	1		12	
			Sevastopol INE&I	3		2	1	
			Kharkov IPh&T	4	1	3		
			KINR	2		1	1	
			Ministry of Fuel and Energy	2			2	
			SNRC of Ukraine	2		1	1	
			Security service of Ukraine	4		2	2	
			NAEC “Energoatom”	5		1	4	
			Total sum	**51**	**6**	**14**	**28**	**3**
17	Designing, installation, adjustment, operation and maintenance service of physical security means (the course is developed for each concrete case, depending on equipment which is established)	2007 80h	Chornobyl NPP	5		1	4	
			Khmelnitski NPP	3			3	
			Zaporozhye NPP	3			3	
			South-Ukrainian NPP	1			1	
			Rivno NPP	7			7	
			Sevastopol INE&I	6	1	2	3	
			Kharkov IPh&T	7	1	2	4	
			KINR	2			2	
			Ministry of Fuel and Energy	-				
			SNRC of Ukraine	-				
			Security service of Ukraine					

			NAEC “Energoatom”	3			3	
			Total sum	**37**	**2**	**5**	**30**	
18	Licensing of nuclear materials and nuclear facilities PPS	2007 40h	Chornobyl NPP	-				
			Khmelnitski NPP	4	2	2		
			Zaporozhye NPP	-				
			South-Ukrainian NPP	-				
			Rivno NPP	3		3		
			Sevastopol INE&I	3	1	2		
			Kharkov IPh&T	3	1	2		
			KINR	1		1		
			Ministry of Fuel and Energy	-				
			SNRC of Ukraine	2		1	1	
			Security service of Ukraine	3		2	1	
			NAEC “Energoatom”	4		2	2	
			Total sum	**23**	**4**	**15**	**4**	
19	PPS organization during shut down and decommissioning stage of nuclear facility	2007	Chornobyl NPP	6	2	2	2	
			Khmelnitski NPP	3	1	1	1	
			Zaporozhye NPP	3	1	1	1	
			South-Ukrainian NPP	3	1	1	1	
			Rivno NPP	3	1	1	1	
			Sevastopol INE&I	1		1		
			Kharkov IPh&T	1		1		
			KINR	1		1		
			Ministry of Fuel and Energy	2		1	1	
			SNRC of Ukraine	3		2	1	
			Security service of Ukraine	2			2	
			NAEC “Energoatom”	2		1	1	
			Total sum	**30**	**6**	**13**	**11**	

Table 4. Training courses topics analysis for the availability of training materials in GKTC

#	Course title with the summary	Duration, hours	Presence of a material in GKTC, %		
			Text material	Presentation material	Training practical exercise
1	**Fundamentals of Physical Protection**	**40**	**100**	**100**	**100**
2	**Regulatory and legal framework and procedures of physical protection**	**40**	**35**	**0**	**0**
	IAEA documents related to ensuring of international regime of PP of NM and NF		50		
	Legislative acts regulating PP issues in the field of nuclear energy use		50		
	Decrees of the President of Ukraine		50		
	Regulatory acts of the Cabinet of Ministers of Ukraine regulating special issues related to ensuring of PP of NM and NF.		50		
	Departmental regulatory acts		0		
	The main concept of regulation in the field of PP (regulation, licensing, supervision/inspection)		40		
	Further improvement of regulatory and legal basis in the field of PP		10		
3	Physical protection technical means including information protection technical means	**40**	**10**	**0**	**0**
4	Physical Protection System Design	**40**	**30**	**5**	**5**
	PPS functions		60	0	0
	General principles of PPS design			0	0
	PPS engineering process		50	0	0
	Analysis and Evaluation of PPS Design		40	20	20
	Design approval		0	0	0
5	PP System Analysis and Modeling	**80**	**40**	**40**	**40**
	Hypothetical Facility description		20	20	20
	Goals and objects of PP		70	70	70

	Approaches to PPS Design Safety Assurance		25	25	25
	The main principles of engineering process		40	40	40
	Design analysis		40	40	40
	Design evaluation		35	35	35
6	Vital Area Identification	**80**	**5**	**60**	**60**
	Facility characterization		30	50	50
	Design basic threat		20	50	50
	Vital area identification process		0	50	50
	Stages of vital area analysis		0	50	50
	Mathematical tool of vital area analysis		0	50	50
	PPS vulnerability analysis		0	50	50
	Work with SAPHAIRE software		0	90	90
7	**PP Vulnerability Assessment including transportation of nuclear material**	**80**	**25**	**25**	**20**
	Regulatory and legal basis in the field of physical protection		100	100	100
	Goals and objectives of PPS		70	70	70
	Threat definition (outsider and insider)		60	60	0
	Target identification (theft, sabotage)		10	10	0
	Development of intruder tactics and strategy		0	0	0
	Physical protection system evaluation concerning threat		0	0	0
	Detection of points of PPS vulnerability		0	0	0
	Compensative and correction measures		0	0	0
	Characteristics of transportation vulnerability assessment (specificity of threat definition, increasing of guards role, level of action co-ordination with regional authority, effectiveness of procedures of transportation security including procedures under emergencies)		0	20	20
8	**Introduction to performance testing of physical protection systems**	**80**	**0**	**0**	**0**
9	**PP management at normal operation and in emergencies**	**80**	**0**	**0**	**0**
10	**Security System Fundamentals for Protective Force Personnel**	**40**	**80**	**80**	**50**

11	**Inspection of condition of physical protection system**	**80**	**0**	**0**	**0**
12	**Support of Design Basic Threat at the State and facility levels.**	**40**	**20**	**30**	**0**
13	**Modern means of physical protection**	**40**	**0**	**0**	**0**
14	**Installation, adjustment and operation of technical means of guard forces**	**40**	**15**	**0**	**0**
15	Management of guard and response forces during emergencies at NF	**40**	**20**	**20**	**20**
16	**Development of procedures on physical protection at a facility, including procedures of special verification and access authorization**	**40**	**10**	**10**	**0**
17	**Designing, installation, adjustment, operation and maintenance service of physical security means (the course is developed for each concrete case, depending on equipment which is established).**	**80**	**0**	**0**	**0**
18	**Licensing of PPS of nuclear materials and nuclear facilities.**	**40**	**0**	**0**	**0**
19	**PPS organization during shut down and decommissioning stage of nuclear facility**	**40**	**0**	**0**	**0**

Given List of training courses is approved in general by all the nuclear operators, regulatory and control bodies of Ukraine.

General Remarks:

- Representatives of nuclear facility pointed out the importance of systematic approach to training of specialists on PP.
- During development of the courses attention should be paid to specific national problems and the issues of interaction between security and safety in nuclear, radiation, fire and technical aspects are to be considered.
- To organize training more on practical issues related to the problems at concrete nuclear facilities.
- Due to increasing terrorists' activity more attention should be paid to the issues of response forces efficient deployment as well as to guard's role in organization of PP at NPP.
- To develop the training course "PP System organization during decommissioning of nuclear facility".
- To develop basic training course "Fundamentals of accounting and control of NM" for specialists of PP divisions of NPPs

REPORT
on the visit of GKTC specialists group, KINR, NASU,
to SE Zaporizhie NPP

In accordance with the Contract # 269936 with Sandia National Laboratories, DOE USA, group of GKTC specialists
V.Gavryliuk
E.Levina
S.Trachevsky
have visited SE "Zaporizhie NPP" on July 11 – 14 2004 in order to agree at the site the following issues:

1. Final discussion on proposed training courses and its summaries.
2. To consider the proposals on the training format.
3. Approval of categorization of NPP PP operative personnel.
4. Determination of the scope of training material and duration of training courses for students of different categories.
5. Search of specialists who are able to participate in development of training materials for the courses.
6. Estimation the possibility to conduct some of the courses directly at NPP's site.
7. Issues of training the trainers on PP for sites:
    a. What categories of PP specialists could be trained directly at site;
    b. What is necessary for organization of such training at site.
8. To consider the necessity and possibility of annual Ukrainian conference on PP of nuclear material and nuclear facilities.

From Zaporizhie NPP the following personnel took part in discussions on the issues given above:
- Deputy Director General on Regime Mr. V. K. Kulinich,
- Assistant to Director General Mr. I. A. Artiukh,
- Head of Division for Internal Security Mr. A.N.Shevchuk,
- Representatives of Division for Physical Protection and Technical Systems.

On the first issue:
Both the list of courses and its summary were considered in details. Zaporizhie NPP is satisfied with the list of proposed courses and its summary. NPP proposed to develop national training course "Testing of technical means for physical protection" provided that the specialists from "Transexpo" Corporation participate in development of training materials and in delivery of the course.

Second issue:
During discussions on the format of training courses NPP's representatives expressed their opinion as follows:

- Training courses should be delivered in GKTC;
- Technical meetings on PP should be held in GKTC or at NPPs sites;
- Carrying out training on PP at site only for own specialists by the instructors trained in GKTC;
- Training of NPP personnel which is not directly involved in work with the PPS, presentations on PP are included into other training courses (NPP Training centers). At Zaporizhie NPP such format of training is already implemented, and they urgently need specially trained instructors. Now the lectures are delivered by NPP managers on physical protection, 2 persons).

Third issue:
Zaporizhie NPP managers proposed to categorize PP personnel in three categories:

- High level (4 – 5 persons at NPP);
- Intermediate level (8 – 9 persons);
- Lower level (30 – 35 persons, guards are not included into this category).

Fourth issue:
Zaporizhie NPP representatives agreed to the duration of the courses for representatives of high level and partially for intermediate level of PP personnel proposed by GKTC. But for some part of intermediate level and lower level the duration of courses has to be defined for each specific course depending on functions of students. Zaporizhie NPP is satisfied with summaries of the courses for specialists of high and intermediate levels. Regarding lower level students training, depending on their professional orientation and functions, training material of each course is to be agreed with NPP PP managers aiming to obtain maximum efficiency of training.

Fifth issue:
Zaporizhie NPP managers see no possibility of participation of NPP staff representatives in development of training material for courses due to their extreme working loading but they agree to review developed training material with the purpose of maximum handling the needs of NPPs.

Sixth issue:
Zaporizhie NPP practically has all the conditions to carry out training courses (excellent training center, all necessary technical means). Unfortunately, there in no hotel in the town to accommodate outside students.
As to training courses for Zaporizhie NPP personnel, they need only trained instructors and relevant training material.

Seventh issue:
Zaporizhie NPP needs instructors for training PP specialists of lower level in the following topics: development and implementation of PP procedures, computer aided access control means (operators), technical means of PP (operation and maintenance).

Eighth issue:
This year in Ukraine the Second Ukrainian Conference on MC&A will take place. The Conference is sponsored by Los Alamos National laboratory, DOE USA. Lately the staff of nuclear power industry of Ukraine has been talking a lot about the necessity of such event in Ukraine, proposing at the same time to organize such Conference at one of nuclear facilities of Ukraine.
Zaporizhie NPP supports this idea and regrets that because of absence of hotel in their town Energodar the first Conference will be organized in another place.

V.Gavryliuk

E. Levine

S.Trachevsky

REPORT
on the visit of GKTC KINR specialists
to South Ukrainian NPP

In accordance with the Contract # 269936 with Sandia National Laboratories, USA, V. Gavrilyuk, A.Gavrylyuk, L.Kushka visited South Ukrainian NPP on July, 21 – 24 2004 aiming to discuss at place the following issues:

1. Final approval of proposed training courses and its abstracts.
2. Discussions of proposals on the format of training.
3. Comments to categorization of NPP physical protection personnel.
4. Determination of the scope of training material and duration of training courses for students of different categories.
5. Looking-for specialists who could participate in development of training materials of the courses.
6. Estimation the possibility to conduct some of the courses directly at NPP site.
7. Training the trainers on PP for sites:
    a. What categories of PP specialists could be trained directly at site,
    b. What actions are necessary for organization of such training at site.
8. To consider the necessity and possibility of annual Ukrainian conference on PP of nuclear material and nuclear facilities.

From SUNPP the following personnel took part in discussions on the issues given above:
Deputy Director General on Regime I.Zhebet,
Head of PP division A.Karasev,
Deputy Chief Engineer on Safety D.Sokolov,
Specialists of PP Division N. Pashko and A.Kiver', and some others.

First issue:
The list of courses and its summary proposed earlier by GKTC to SUNPP were approved in general. At the same time SUNPP is of opinion that the Course "Inspection of PP " and the Course "Licensing of PPS of NM and NF" should be combined into one. Probably it is expedient.

Second issue:
SUNPP stands for the following format of training:

- training courses (both in the GKTC and at NPP sites);
- technical meetings on important issues of PP of Ukrainian NPPs;

Training at their site of specialists on PP by own instructors trained in GKTC.

Third issue:
SUNPP proposed to categorize PP personnel in three categories:

- High (managers of SUNPP and managers of PPS of SUNPP);
- Intermediate (Head of PP Division, heads of teams);
- Lower (engineers on support and maintenance of PP Systems, engineers on regime).

Fourth issue:
SUNPP agreed in general to the scope of courses proposed by GKTC. At the same time Mr. I.Zhebet insisted that the most of courses should be one week courses. In addition they criticized GKTC because of absence of specific courses for personnel

contracted by NPP administration to guard objects of secondary importance running from the site (for example, hot water pipelines for the town).

Fifth issue:

After familiarization with the list and summaries of the courses proposed by GKTC SUNPP PP specialists suggested their service for development of the following training material:

Mr. I.Zhebet and N.Pashko “Development of PP procedures for a facility, including performing of specific verification and access authorization”,

Mr. I.Zhebet “Control of PP system at normal operation and in emergencies”,

A.Kiver’ “Modern means of physical protection”.

Sixth issue:

SUNPP has necessary infrastructure and basis to carry out training courses and technical meetings: place for students accommodation, classroom, presentations equipment, copy printers, dining room for students. GKTC representatives looked over these places and gave high estimation to them.

Seventh issue:

2 instructors should be trained for SUNPP for subsequent training of PP specialists of lower level. Besides, training material is needed for organization of training of PP specialists at site. The rest of training means and other necessities are available at site.

Eighth issue:

Supporting the proposal to carry out annual Ukrainian conferences on PP of nuclear material and nuclear facilities, SUNPP suggested to organize the first Ukrainian Conference on PP in May 2005 in their satellite town South-Ukrainsk.

V.Gavryliuk

A.Gavrylyuk

L.Kushka

LIST OF NM PP TRAINING COURSES

for Baltic countries and NIS

1. Crisis management on nuclear facility

- State legal acts in the field of PP of NM and NF and struggle against terrorism (is to be prepared by the course participants);
- Responsibility for NF PPS condition at nuclear facility;
- Organization of subdivision of physical security at nuclear facility, the role of its components;
- Distribution of responsibilities and authorities between nuclear facility management and guards headquarters;
- Development of PP procedures including procedures of access authorization, security clearance and protection;
- Development and setting into operation of system and means of NF security (act of inter-departmental commission);
- Methodology of development of Response Interaction Plans at emergency situations;
- Interaction plans under emergencies including case of nuclear terrorism;
- Methods of conduct of crisis negotiations, psychological aspects of negotiations;
- Development of action scenario and guards training for specific emergency operations, role of technical means at anti-terrorist actions;
- Emergency situation at nuclear facility (nuclear material theft, capture of hostages, attempt/execution of act of terrorism);
- Application of interaction plan under emergency;
- Creation of central headquarters for crisis management;
- Cooperation of central headquarters with facility management, state and regional authorities;
- Realization of crisis negotiations with terrorists if it is necessary;
- Emergency resolution in case of: NM theft, taking hostages, attempt and commission of terrorism act;
- PP management of nuclear facility during period of recovery.

The *Crisis management on nuclear facility* course will be conducted at GKTC in November 8-17, 2004. All training material is provided by SNL instructors with the involvement of Ukrainian instructors for training practical exercises. Duration of this course is 80 hours.

2. Design Basic Threat under State and facility levels.

- Terrorists activity analysis for the last 2-3 years;
- New approaches to the struggle against terrorism at national and international levels;
- The role of DBT in PP of nuclear material and nuclear facility. DBT – the basis of PP establishing and modernization both at the state and at the facility levels;
- State legislative basis about the role of competent organs in DBT approval;
- Regulatory requirements to DBT;
- Information sources for DBT;
- Threat analysis and evaluation;

- Implementation of DBT;
- Upgrading of DBT. Main principles of DBT upgrading;
- Possible ways of revision of approaches to DBT definition.

The *Design Basic Threat under State and facility levels* course was conducted at GKTC also, but it is necessary to elaborate an existing course in view of changed approaches for previous years to an estimation of threats. Also it is necessary to consider issues of updating DBT in more details. In our opinion, course duration should be 40 hours.

3. Fundamentals of Physical Protection

- Physical security and physical protection;
- Conception "Physical protection system" of nuclear material and nuclear facilities;
- Requirements of PP state system;
- Design basis threat;
- Role of regulatory agency in assurance of PP of nuclear material and nuclear facility. Regulation and licensing;
- PP procedures including action plan in case of emergency;
- PPS design fundamentals;
- Technical means of PP system;
- Assembling, adjustment, testing, commissioning, operation and maintenance of PP technical means;
- Guards as a component of PPS;
- Performance testing of PPS, its subsystems and separate components;
- Vulnerability Assessment of PPS;
- Corrective measures;
- Quality assurance issues in the field of PP;
- Inspection of PP system by the oversight body and verification of PP system by the control body. IPPAS mission.
- Annex:

  Nuclear material and nuclear facilities, nuclear weapon;

  Hypothetic nuclear facility.

The *Fundamentals of Physical Protection* course*.* Now the course on the given topic is developed for the Ukrainian PP's specialists. Its duration is 40 hours. For the NIS/Baltics physical protection system personnel the expedient duration of course is 80 hours. Therefore 40-hours course can be taken for a basis, and also, it will be possible to use a material of the *Security System of Analysis and Modeling* course, developed by SNL instructors.

4. Inspection of physical protection system conditions

- Convention on Physical Protection;
- IAEA recommendations on nuclear material and nuclear facility physical protection (INFCIRC/225/Rev/4(corrected))
- Legal acts requirements to PP of NM and NF;

- Interaction of regulatory activity, licensing and supervision as a function of PP state regulation of NM and NF;
- Goals and objectives of PPS condition inspections;
- Procedure of inspection conducting; types of inspections;
- Rights and duties of state inspectors;
- Rights and duties of nuclear facilities and operating organizations under during inspection;
- Planning and preparing of inspections;
- Conducting of inspections;
- Drawing up of the results, prescriptions and sanctions of supervising body;
- The order of granting to involved state bodies of the information on an actual condition of physical protection of nuclear facility
- Role of supervision body inspectors at IPPAS mission conducting.

The *Inspection of a condition of physical protection system* course has not been conducted before and need complete developing. Prospective course duration is 40 hours on conditions that the inspectors will preliminary take the *Fundamentals of Physical Protection* course.

LIST OF NM PP TRAINING COURSES
for Baltic countries and NIS

№	Course Title	*Country*	Number of participants
1	Crisis management on nuclear facility	Azerbaijan	2
		Armenia	15
		Belarus	5
		Georgia	3
		Kyrgystan	2
		Tajikistan	1
		Uzbekistan	7
		Latvia	4
		Lithuania	12
		Total	51
2	Design Basic Threat under State and facility levels.	Azerbaijan	2
		Armenia	13
		Belarus	8
		Georgia	2
		Kyrgystan	2
		Tajikistan	1
		Uzbekistan	10
		Latvia	2
		Lithuania	5
		Total	45
3	Fundamentals of Physical Protection	Azerbaijan	6
		Armenia	16
		Belarus	11
		Georgia	3
		Kyrgystan	-

		Tajikistan	2
		Uzbekistan	10
		Latvia	3
		Lithuania	16
		Total	67
4	Inspection of a condition of physical protection system	Azerbaijan	4
		Armenia	8
		Belarus	10
		Georgia	3
		Kyrgystan	2
		Tajikistan	1
		Uzbekistan	7
		Latvia	2
		Lithuania	2
		Total	39

Notes: Latvia would like to conduct training for Latvian specialists in Riga, at that, in course 1 will be able to participate 20 persons, in course 2 – 20 persons, in course 4 – 10 persons

Kazakhstan Republic did not reply on our request.

LIST OF MC&A TRAINING COURSES IN GKTC
2005 - 2007

#	Training Course	Attendees	Data/duration
1	**Nuclear Material Management Culture (in State, at the facility).** - Nuclear material, nuclear weapons. Peaceful use of nuclear energy. - Non-proliferation Treaty. - Non-proliferation problems in the today's world. - Safeguards Agreement between IAEA and the State. Subsidiary arrangements. Additional Protocol. - Convention on physical protection of nuclear material and facilities. - Laws and state legal regulations in the field of peaceful use of nuclear energy. - State MC&A system and its main functions. - MC&A system at the level of facility, its main functions. - Automation of MC&A system. - Development and implementation of MC&A procedures at the level of State, Ministry, operator, facility including the case of anomaly. - Quality ensuring program and quality management in the MC&A field. - MC&A personal trustworthy ensuring. Training and advanced training of personnel in the MC&A field. - Interrelationship of physical protection and MC&A systems at the level of State and facility including the questions of information security. - Interrelationship of State MC&A system, Facility MC&A system and IAEA Safeguards system. - Responsibility of State, Ministry, operator, facility for the proper status of MC&A system.	MC&A management of regulatory and administrative authorities and facilities; Personnel of nuclear materials control and accounting departments at facilities; Instructors.	2005 Mart, second half 40h
2	**State MC&A system. Operator (facility) MC&A system.** A. State MC&A system: - IAEA requirements to State MC&A system. - Laws, regulations and rules on development and performance of State MC&A system. - Managerial elements of State MC&A system at the state level (objectives, competent authority responsible for State MC&A system, its authorities and responsibilities, State MC&A system requirements). - Inspection activity, control of the fulfillment of State MC&A system requirements.	MC&A management of regulatory and administrative authorities and facilities; Personnel of nuclear materials control and accounting departments at facilities;	2005 June, first half 40 h

	- MC&A information system. - Role of State MC&A system in the implementation of Safeguards Agreement between IAEA and the State. B. Facility MC&A system: - Facility MC&A system creation. - Managerial and technical measures for facility MC&A system implementation. - Authorities and responsibilities of the facility head and MC&A system personal in the field of fulfillment of State MC&A system requirements. - Accounting reports and records. - Material and technical basis of Facility MC&A system. - Procedures of Facility MC&A system on containment/surveillance of nuclear material and nuclear material measurements. - MC&A data recording. - Facility MC&A system and IAEA inspections.	Instructors.	
3	**Fundamentals of Material Control and Accounting.** - Nuclear material and nuclear energy; nuclear weapons; peaceful use of nuclear energy. - Non-proliferation policy. - IAEA and its role in the field of nuclear energy use. - IAEA safeguards approach. - IAEA requirements to State MC&A system. - Organization, structure and functions of State MC&A system. Tasks and objectives of State MC&A system: national and international. - Facility MC&A system. Objectives, tasks, organization and control of facility MC&A system performance. - MC&A methods. - Reporting and accounting documents. - MC&A procedures. - Inspections of MC&A status at the facility: IAEA inspections; Regulatory Body inspections.	Personnel beginning to work in the field of control and accounting	Preparing of Ukrainian Course (2005) 40h
4	**MC&A Computerization.** - IAEA safeguards implementation in the State. State MC&A system. Tasks and objectives of State MC&A system. Structure and functions of State MC&A system. Cooperation with IAEA. - Facility MC&A system, its structure and functions. Interaction of Facility MC&A system with IAEA and State MC&A system. - Legal regulations of State and Facility MC&A systems. - Report and accounting recording of State and Facility MC&A systems. - Difficulties of non-computerized nuclear materials control and accounting in the case of large quantities of nuclear materials.	Personnel of nuclear materials control and accounting departments at facilities; Instructors.	2006 40h

	- Modern computerized MC&A systems: requirements, possibilities. - Features of Computerized MC&A systems at the facilities with Power Reactor and Research Reactor. - Features of Computerized MC&A systems at the facilities with material in bulk form. - Improvement of MC&A system software. - Information security. - Procedures of computerized MC&A system. - Human factor during the MC&A Computerization. - Development of quality ensuring programs for computerized MC&A systems including personal requirements.		
5	**Nondestructive Assay of Nuclear Materials: Gamma and Neutron Ones.** - Nuclear material. Special nuclear material. - Objectives and tasks of nuclear material measurements/assay: assay types - destructive and non-destructive. - Role of non-destructive assay for proper nuclear materials control and accounting. - Methods of non-destructive assay based on gamma-ray measurements and neutron counting. - Non-destructive assay equipment. - Requirements to non-destructive assay detectors and measuring systems. - Techniques of uranium enrichment measurements. - Passive and active neutron assay techniques. - Quality ensuring during measurements and data processing. - Software and statistics methods for measurement data processing.	Personnel of nuclear materials control and accounting departments at facilities; Instructors.	2005 October 80h
6	**Means of Nuclear Material Access Control. Tamper Indication Devices.** - Nuclear material and nuclear weapons. - Non-proliferation Treaty. - Safeguards Agreement between IAEA and the State due Non-proliferation Treaty. - State legal regulations in the field of material physical protection, control and accounting. - National system for physical protection of nuclear materials and facilities. - State MC&A system. - Facility physical protection system. - Facility MC&A system. - Facility procedures of material physical protection, control and accounting, including access ones. - Access control means of physical protection system. - MC&A system security means. - IAEA containment and surveillance means.	Personnel of nuclear materials control and accounting departments at facilities.	2006 40h

	- IAEA and Regulatory Body inspection activity. - Operator responsibility for non-observance of nuclear material access and IAEA safeguards procedures.		
7	**Performance and Efficiency Testing of MC&A Systems and Their Elements** - State legal regulations requirements to MC&A system and its elements. - Terminology. - Types, objectives and tasks of tests. - Testing personal, means and methods. - Planning and development of testing quality programs. - Selection of evaluation criteria. - Testing realization and results recording. - Evaluation of performance and efficiency for the system as a whole and system elements. - Correction measures after testing. - Practical training on testing of one or several elements of MC&A system.	Personnel of nuclear materials control and accounting departments at facilities; Instructors.	2006 40h
8	**Planning, Preparation and Performance of Physical Inventory.** - Requirements of Safeguards Agreement and Additional Protocol - Facility MC&A system. Functions and structure of the MC&A system depending of the type of facility and form of nuclear material. - Material balance area. Key measuring points. Measurement systems. - Facility system of accounting records and reports. - IAEA technical procedures on material flow monitoring at the facility. - Material balance period. - Objectives and tasks of physical inventory at the facility. Requirements of State Regulatory Body. Operator (facility) administration charge during the preparation and performance of physical inventory. - Personal, means and methods of the physical inventory performance. - Measurements role. - Physical inventory features for the facility with material in bulk form. Physical inventory performance at the facility in the case of accident. - Physical inventory taking. - Material balance evaluation. - Material balance report. - IAEA inspections on physical inventory verification.	Personnel of nuclear materials control and accounting departments at facilities; Instructors.	2007 40h
9	**Statistics Methods Used for Nuclear Materials Control and Accounting.**	Personnel involved in	2007

	- Terminology of modern statistics methods. - Necessity of statistics methods use for MC&A procedures. - Fundamentals of uncertainty theory. - Modern MC&A statistics methods. - Dispersion analysis. - Statistics methods software. - Statistics methods at: nuclear material measurements; material measurements control; physical inventory taking. - Inspections and verifications of physical inventory - Practical training on MC&A statistics methods use.	nuclear material measurements; Instructors in this field.	40h
10	**MC&A System Inspections.** - Safeguards Agreement between IAEA and the State. Requirements of Additional Protocol. - State MC&A legal regulations, IAEA inspection activity in the State, State Regulatory Body inspection activity. - IAEA inspections: types of inspections; matter of the inspection activity; technical objectives of safeguards; authorities and responsibilities of State Executive Body and Operators on support of IAEA inspection activity. - Regulatory Body inspections: inspection activity procedures; inspection activity tasks; objectives and tasks of the inspection, development of MC&A inspection plan for a prototype facility. - Inspector authorities and responsibilities, authorities and responsibilities of inspected. - Inspection taking. - Inspection results analysis, correction measures and sanctions. - Informing of State and Administrative Authorities about the status on nuclear material safety.	Inspectors; MC&A management of regulatory and administrative authorities and facilities.	2007 80h

List of prospective students, by facility, for MC&A courses

#	Training Course	Facility	Number of students for each course			
			Total	Instructors	Managers	Engineers
1	**Nuclear Material Management Culture (in State, at the facility)**	Chornobyl NPP	6	-	2	4
		Khmelnitski NPP	6	1	2	3
		Zaporozhye NPP	20	1	15	4
		South-Ukrainian NPP	5	-	2	3
		Rivno NPP	6	1	2	3
		Sevastopol INE&I	9	1	5	3
		Kharkov IPh&T	8	4	2	2
		KINR	5	1	1	3
		Ministry of Fuel and Energy	6	-	3	3
		SNRC of Ukraine	6	-	1	5
		NAEC “Energoatom”	5	-	3	2
		Total sum	***82***	***9***	***38***	***35***
2	**State MC&A system. Operator (facility) MC&A system**	Chornobyl NPP	7	-	3	4
		Khmelnitski NPP	5	-	2	3
		Zaporozhye NPP	15	1	10	4
		South-Ukrainian NPP	5	-	2	3
		Rivno NPP	8	1	3	4
		Sevastopol INE&I	9	3	4	2
		Kharkov IPh&T	8	4	2	2
		KINR	3	-	1	2
		Ministry of Fuel and Energy	4	-	2	2
		SNRC of Ukraine	-	-	-	-
		NAEC “Energoatom”	-	-	-	-

		Total sum	***64***	***9***	***29***	***26***
3	**Fundamentals of Material Control and Accounting**	Chornobyl NPP	6	-	2	4
		Khmelnitski NPP	3	1	1	1
		Zaporozhye NPP	4	1	-	3
		South-Ukrainian NPP	5	-	2	3
		Rivno NPP	3	1	1	1
		Sevastopol INE&I	8	3	3	2
		Kharkov IPh&T	4	4	-	4
		KINR	2	-	1	1
		Ministry of Fuel and Energy	2	-	1	1
		SNRC of Ukraine	3	-	-	3
		NAEC “Energoatom”	4	-	2	2
		Total sum	***44***	***10***	***11***	***23***
4	**MC&A Computerization**	Chornobyl NPP	6	-	2	4
		Khmelnitski NPP	1	-	-	1
		Zaporozhye NPP	4	-	-	4
		South-Ukrainian NPP	5	-	2	3
		Rivno NPP	2	-	-	2
		Sevastopol INE&I	7	2	3	2
		Kharkov IPh&T	6	2	-	4
		KINR	2	-	-	2
		Ministry of Fuel and Energy	2	-	1	1
		SNRC of Ukraine	3	-	1	2
		NAEC “Energoatom”	4	-	1	3
		Total sum	***42***	***4***	***10***	***28***
5		Chornobyl NPP	4	-	2	2

	Nondestructive Assay of Nuclear Materials: Gamma and Neutron Ones	Khmelnitski NPP	3	-	1	2
		Zaporozhye NPP	5	-	3	2
		South-Ukrainian NPP	3	-	1	2
		Rivno NPP	4	-	1	3
		Sevastopol INE&I	11	3	4	4
		Kharkov IPh&T	9	2	-	7
		KINR	2	-	-	2
		Ministry of Fuel and Energy	-	-	-	-
		SNRC of Ukraine	-	-	-	2
		NAEC “Energoatom”	1	-	-	1
		Total sum	***42***	***5***	***12***	***27***
6	**Means of Nuclear Material Access Control. Tamper Indication Devices.**	Chornobyl NPP	4	-	2	2
		Khmelnitski NPP	4	-	1	3
		Zaporozhye NPP	10	1	5	4
		South-Ukrainian NPP	5	-	2	3
		Rivno NPP	4	-	1	3
		Sevastopol INE&I	7	2	3	2
		Kharkov IPh&T	6	2	2	2
		KINR	2	-	1	1
		Ministry of Fuel and Energy	1	-	-	1
		SNRC of Ukraine	2	-	1	1
		NAEC “Energoatom”	1	-	-	1
		Total sum	***46***	***5***	***18***	***23***
7	**Performance and Efficiency Testing of MC&A Systems and Their Elements**	Chornobyl NPP	4	-	2	2
		Khmelnitski NPP	3	-	1	2
		Zaporozhye NPP	9	-	5	4
		South-Ukrainian NPP	3	-	1	2

		Rivno NPP	4	-	1	3
		Sevastopol INE&I	7	2	3	2
		Kharkov IPh&T	5	2	1	2
		KINR	2	-	1	1
		Ministry of Fuel and Energy	1	-	-	1
		SNRC of Ukraine	2	-	1	1
		NAEC “Energoatom”	2	-	1	1
		Total sum	***42***	***4***	***17***	***21***
8	**Planning, Preparation and Performance of Physical Inventory**	Chornobyl NPP	6	-	2	4
		Khmelnitski NPP	2	-	1	1
		Zaporozhye NPP	3	1	1	1
		South-Ukrainian NPP	2	-	1	1
		Rivno NPP	2	-	1	1
		Sevastopol INE&I	7	2	3	2
		Kharkov IPh&T	5	2	1	2
		KINR	2	-	1	1
		Ministry of Fuel and Energy	1	-	-	1
		SNRC of Ukraine	3	-	1	2
		NAEC “Energoatom”	3	-	1	2
		Total sum	***36***	***5***	***13***	***18***
9	**Statistics Methods Used for Nuclear Materials Control and Accounting.**	Chornobyl NPP	4	-	2	2
		Khmelnitski NPP	3	-	1	2
		Zaporozhye NPP	4	-	1	3
		South-Ukrainian NPP		-	-	-
		Rivno NPP	2	-	1	1
		Sevastopol INE&I	5	2	1	2
		Kharkov IPh&T	4	-	2	2
		KINR	2	-	1	1

		Ministry of Fuel and Energy	2	-	1	1
		SNRC of Ukraine	3	-	1	2
		NAEC “Energoatom”	3	-	1	2
		Total sum	***32***	***2***	***12***	***18***
10	**MC&A System Inspections**	Chornobyl NPP	6	-	2	4
		Khmelnitski NPP	1	-	1	-
		Zaporozhye NPP	2	-	2	-
		South-Ukrainian NPP	1	-	1	-
		Rivno NPP	2	-	1	1
		Sevastopol INE&I	5	2	1	2
		Kharkov IPh&T	1	-	1	-
		KINR	1	-	1	-
		Ministry of Fuel and Energy	5	-	2	3
		SNRC of Ukraine	5	-	2	3
		NAEC “Energoatom”	4	-	2	2
		Total sum	***33***	***2***	***16***	***15***

LIST OF MC&A TRAINING COURSES IN GKTC
for NIS & Baltia countries

1. Fundamentals of Material Control and Accounting

- Nuclear material and nuclear energy; nuclear weapons; peaceful use of nuclear energy.
- Non-proliferation policy.
- IAEA and its role in the field of nuclear energy use.
- IAEA safeguards approach.
- IAEA requirements to State MC&A system.
- Organization, structure and functions of State MC&A system. Tasks and objectives of State MC&A system: national and international.
- Facility MC&A system. Objectives, tasks, organization and control of facility MC&A system performance.
- MC&A methods.
- Reporting and accounting documents.
- MC&A procedures.
- Inspections of MC&A status at the facility: IAEA inspections; Regulatory Body inspections.

2. Nondestructive Assay of Nuclear Materials: Gamma and Neutron Ones

- Nuclear material. Special nuclear material.
- Objectives and tasks of nuclear material measurements/assay: assay types - destructive and non-destructive.
- Role of non-destructive assay for proper nuclear materials control and accounting.
- Methods of non-destructive assay based on gamma-ray measurements and neutron counting.
- Non-destructive assay equipment.
- Requirements to non-destructive assay detectors and measuring systems.
- Techniques of uranium enrichment measurements.
- Passive and active neutron assay techniques.
- Quality ensuring during measurements and data processing.
- Software and statistics methods for measurement data processing.

3. MC&A System Inspections

- Safeguards Agreement between IAEA and the State. Requirements of Additional Protocol.
- State MC&A legal regulations, IAEA inspection activity in the State, State Regulatory Body inspection activity.
- IAEA inspections: types of inspections; matter of the inspection activity; technical objectives of safeguards; authorities and responsibilities of State Executive Body and Operators on support of IAEA inspection activity.
- Regulatory Body inspections: inspection activity procedures; inspection activity tasks; objectives and tasks of the inspection, development of MC&A inspection plan for a prototype facility.
- Inspector authorities and responsibilities, authorities and responsibilities of inspected.
- Inspection taking.
- Inspection results analysis, correction measures and sanctions.
- Informing of State and Administrative Authorities about the status on nuclear material safety.

List of prospective NIS/Baltics students, by country, for MC&A courses

Title of course	Country									Total
	Tajikistan	Kyrgyzstan	Latvia	Belarus	Georgia	Azerbaijan	Uzbekistan	Lithuania	Armenia	
Fundamentals of material control and accounting	2	2	4	11	3	5	8	4	4	43
Nondestructive assay of nuclear materials: gamma and neutron ones	2	2	3	8	4	4	6	1	3	33
MC&A system inspections	2	2	2	9	3	4	7	3	4	36
										139

Appendix E. Review GKTC student data and development of a database of Ukrainian MPC&A experts for the George Kuzmycz Training Center

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Table 1

LIST OF ORGANIZATIONS WHOSE EMPLOYEES WERE TRAINED IN GKTC

No	Organization
1	Zaporozhie NPP
2	Khmelnitsky NPP
3	South Ukraine NPP
4	Chernobyl NPP
5	Rovno NPP
6	Kharkov Institute of Physics and Technology
7	Sevastopol National Institute of Nuclear Energy and Industry
8	Institute for Nuclear Research of Ukrainian National Academy of Science
9	The Kiev Institute “Energoproect”
10	State Nuclear Regulatory Committee of Ukraine
11	National Atomic Energy Company “Energoatom”
12	Ministry of fuel and energy of Ukraine
13	The Ministry of Internal Affairs of Ukraine
14	Security Service of Ukraine
15	East mining-and-processing integrated works
16	Central administrative board of struggle against terrorism
17	State Scientific and Technical Center

Table 2

LIST OF PHYSICAL PROTECTION TRAINING COURSES

No	Course	Data	Number of Participants
1	Fundamentals of Physical Protection	May 27 – 31, 1996	41
2	Vulnerability Assessment	November 18 – 23, 1996	40
3	Physical Protection System Design Overview	June 23 – 27, 1997	41
4	Vulnerability Assessment	October 20-24, 1997	40
5	Vulnerability Assessment of Physical Protection System under Transportation of Nuclear Material	September 20 – 24, 1999	40
6	Design Basic Threat	July 17 – 21, 2000	20
7	Advantor Electronic System of Safety	Sep. 25– Oct.6, 2000	12
8	Design Basic Threat (Session II)	November 14 – 16, 2000	20
9	Training Course on physical protection for MVD personnel (part 1)	June 18 – 29, 2001	30
10	Training Course on physical protection for MVD personnel (part 2)	August 13 – 17, 2001	30
11	Vital Area Identification (part 1)	January 14 – 18, 2002	20
12	Vital Area Identification (part 2)	September 23 – 27, 2002	20
13	Security System Fundamentals for Protective Force Personnel	May 12-16, 2003	30
14	Security System Analysis and Modeling	July 21 – August 1, 2003	18
15	Maintenance of “ADVANTOR” Devices and Equipment that are a Part of Physical Protection System of Nuclear facilities	August 25 – September 5, 2003	22
16	Crisis Management	October 3 – 14, 2003	30

Table 3

LIST OF CONTROL AND ACCOUNTING TRAINING COURSES

No	Course	Data	Number of Participants
1	Advanced Statistics and Measurement Control Course	September 8 – 12, 1997	30
2	Nuclear Material Control and Accounting	October 27 – 31, 1997	40
3	Advanced Material Control and Accounting	December 14 – 18, 1998	40
4	Nuclear Material Control and Accounting	September 15-19, 2003	24

Table 4

LIST OF MPC&A TRAINING COURSES

No	Course	Data	Number of Participants
1	MPC&A Procedures Development	June 18 – 23, 2000	18 (7 from Ukr)

Table 5

SUMMARIZING DATA ABOUT NUMBER OF GKTC TRAINING COURSES ON MPC&A DURING 1996 - 2003

Number of courses			
PP	**C&A**	**PP+C&A**	**Total**
16	4	1	21

Table 6

NUMBER OF PERSONS WHO HAVE TAKEN DIFFERENT NUMBER OF COURSES AT GKTC

Number of courses / Subject	**1**	**2**	**3**	**4**	**5 - 8**	**Total**
PP	127	44	24	14	13	222
C&A	41	10	11	2	-	64
PP+C&A						286

Table 7

DATA ABOUT NUMBER OF GKTC STUDENTS ON CONTROL AND ACCOUNTING OF NUCLEAR MATERIAL

Facility	**Employees number who have taken the courses at GKTC**	**Employees number who still are working at the facility**	**Total number of the C&A personnel**	**Persons who changed the place of work, but still are working in the C&A field**
Zaporozhie NPP	4	3	11	
Khmelnitsky NPP	6	3	12	
South Ukraine NPP	6	4	7	
Chernobyl NPP	6	4	6	
Rovno NPP	3	3	6	
Kharkov Institute of Physics and Technology	6	6	10	
Sevastopol National Institute of Nuclear Energy and Industry	4	2	2	
Institute for Nuclear Research of Ukrainian National Academy of Science	9	7	5	
State Nuclear Regulatory Committee of Ukraine	7	5	5	1
Ministry of fuel and energy of Ukraine	5	3	2	
State Scientific and Technical Center	7	4	4	1
National Atomic Energy Company “Energoatom”	1	1	2	

Table 8

DATA ABOUT NUMBER OF GKTC STUDENTS ON PHYSICAL PROTECTION OF NUCLEAR MATERIAL

Facility	Employees number who have taken the courses at GKTC	Employees number who still are working at the facility	Total number of the PP personnel	Persons who changed the place of work, but still are working in the PP field
Zaporozhie NPP	8	7	13	
Khmelnitsky NPP	7	6	23	
South Ukraine NPP	12	7	15	1
Chernobyl NPP	7	6	55	
Rovno NPP	7	4	19	1
Kharkov Institute of Physics and Technology	10	8	8	
Sevastopol National Institute of Nuclear Energy and Industry	8	6	5	
Institute for Nuclear Research of Ukrainian National Academy of Science	13	8	6	2
The Kiev Institute “Energoproect”	6	6	6	
State Nuclear Regulatory Committee of Ukraine	13	7	7	3
National Atomic Energy Company “Energoatom”	5	3	3	
Ministry of fuel and energy of Ukraine	5	4	7	
The Ministry of Internal Affairs of Ukraine	93			
Security Service of Ukraine	24			
East mining-and-processing integrated works	1	1		
Central administrative board of struggle against terrorism	3	3		

Duration of each course is 1 – 2 weeks. Some courses, for instance, the training course "Vital Areas Identification" and "Training course on Physical Protection for officers of NF guard forces" are planned for 4 weeks and were divided into two parts and delivered 2 weeks each.

Contingent of specialists trained in GKTC can be divided in three main groups:

- Managers on physical protection working at the state, departmental and facility levels;
- Engineers and technicians involved into maintenance of physical protection systems'engineering and technical means;
- Officers of MVD forces, who guard nuclear facilities.

Employees of regulatory and control body took part in some of these courses depending on their responsibilities.

222 specialists improved their PP skills at the courses held at GKTC. Representatives of regulatory and control bodies, and deputy directors of NPP on PP have passed the biggest number of courses (from 5 to 8) (Table 3). 60% of listeners participated only in one training course.

Thus, of 222 persons participated in PP courses in 1996 – 2004, the 142 former listeners keep working (65%). The questionnaire was sent to them. 96% of participants sent their answers to us. 58% of respondents noted that training in the GKTC assisted to their career development.

All the listeners marked the usefulness of the courses for their work. It was noted that the courses assisted to them in systematization of knowledge on PP, gave new knowledge, which was necessary for improvement of PP at nuclear facilities.

For instance the Course "Electronic systems for protection of ADVANTOR Company" was useful for familiarization with working methods of ADVANTOR technicians for maintenance of PP systems. The Course "Definition of Vital Areas" gives chance to estimate the advantages of scientific systematic approach to priorities in determining of vital areas . The Course "Crisis Incident Management" was very useful because the participants in their further work could apply this knowledge for preparation to crisis incident exercise included into NPP complex training, for anti-terror actions, anti-sabotage measures, and development of regulatory documents in the field of PP. The Course "Vulnerability Assessment of PP system during NM transport" was very useful especially for Chernobyl NPP specialists, because decommissioning of Chernobyl NPP provides for transport of spent nuclear fuel (SNF) from NPP site to SNF storage facility-2 situated within 7 km.

Analysis carried out by the GKTC showed that specialists on PP of all the levels were involved to training courses – from top managers of nuclear facilities (NF) and regulatory and control bodies to engineers and technicians of PP divisions at NF. Key topics of PP of nuclear material and nuclear facilities have been considered at the courses delivered during the years of GKTC activity. That allowed developing the unified understanding of main concepts and approaches in PP. During last year and a half the leaders of PP at nuclear facilities have been able to implement a number of measures on upgrading of PP technical means, to develop a set of procedures on PP, to strengthen cooperation between guard forces (this function is carried out by MVD troops) and technicians of PP divisions at NF. As we have noted in the previous reports deputy directors on PP of NPPs were the most frequent listeners of our courses. The fact that during the last years none of them

was dismissed in spite of large scale of changes of executive personnel at all the NPPs of Ukraine without exception confirms the high level of their knowledge and qualification in the field of PP. As well, the fact of involving of some listeners to development of training materials and performing the presentations is an evidence of efficiency of conducted training.

Familiarization during training of PP specialists of Ukraine with positive international experience assisted to raise the questions on development and revision of acting regulatory and legal acts of Ukraine on PP and to take part by themselves in the development of these documents. From another side there is an obvious lack of knowledge obtained by the listeners at the training courses in connection with the new goals and tasks. (в связи с появлением новых целей и задач) Therefore on the basis of proposals received from nuclear facilities staff the GKTC has prepared a list of courses to be developed. The main requirement for further courses is the compliance with regulations and rules of Ukraine in the field of PP of NM and NF. In addition to that, the establishment of PP divisions at NF as well as commissioning of the two new power units at the two NPPs caused the increase of PP staff , which needs training for refreshing and upgrading of their qualification on PP of NM and NF.

Analysis of Trainees Questioning

Out of 222 specialists, who have participated in the courses on PP in 1996 – 2004, 142 specialists keep on working. GKTC has sent the questionnaires to them.
96% of the participants filled in the questionnaire as it is seen in the Table 9.
Table 9

Facilities	Total number of PP personnel	Number of employees		
		Trained in GKTC	Still working	Answered to the questions
ZAPORIZHIE NPP	13	8	7	5
KHMELNITSKY NPP	23	7	6	5
SOUTH-UKRAINIAN NPP	15	12	7	7
CHERNOBYL NPP	86	7	6	5
RIVNE NPP	19	7	4	3
SC KhPTI	8	10	8	7
SEBASTOPOL INSTITUTE OF NUCLEAR ENERGY AND INDUSTRY	6	8	5	5
INR NAS of UKRAINE	6	13	7	7
KIEV INSTITUTE "ENERGOPROEKT"	6	6	6	6
STATE NUCLEAR REGULATORY COMMITTEE OF UKRAINE	7	13	4	4
NATIONAL ATOMIC ENERGY COMPANY "ENERGOATOM"	3	5	3	2
MINISTRY OF FUEL AND ENERGY OF UKRAINE	7	5	4	4
MINISTRY OF INTERNAL AFFAIRS		93	69	69
STATE SECURITY SERVICE OF UKRAINE		24	6	6
EASTERN ORE MINING AND PROCESSING ENTERPRISE		1	1	1
MAIN ADMINISTRATION ON STRUGGLE AGAINST TERRORISM		3	3	3
IN TOTAL :		222	145	139

The respondents gave the following proposals:

Before the course to send the Syllabus to the participants (topics of the lectures, content of the exercises) in order to make corrections timely depending on the specific requirements of the listeners.

Along with general training material a course should include maximum concrete examples and practical exercises.

To increase number of hours for practical training.

To include the presentations on practical solutions of organization of physical protection of specific facilities or its elements with following review and discussions between the participants.

For example, personnel access to the objects under construction at the nuclear facility site and beyond.

Courses should content less general material but more concrete examples of calculations and methods of measurements.

To adapt the training material of the courses to legislative and regulatory requirements on physical protection issues.

To systematize the legislative basis and regulations on physical protection.

Fundamental course on physical protection of NM and NF and its practical implementation taking into account the requirements of national legislation should be a unified training course.

To adapt the course to the requirements of the Ukrainian regulatory standards.

GKTC together with the SNRCU could define the required scope of knowledge for NPP PP specialists and in the future to use it for development of individual training programs.

Financial support of all the international courses on PP is carried out by the Department of Energy of the USA; therefore we can give them a proposal on the establishment of unified system in which each course will be one of the training stages with sequential up-grading of rating.

To adapt the material of training courses to nuclear power installations.

To organize a course with visiting a facility or field training at specific facility, including outside the Ukraine.

To take part in refreshing training courses regularly.

To continue a series of training courses on the topics “Physical Protection”, “Emergency Response”.

To extend themes and to improve the course “Emergency Situation Management”.

To establish regional training center on the basis of GKTC.

To strengthen training and technical basis – training simulator at the open air.

During training course for licensees in the field of PP - to invite the representatives of the SNRCU as members of examination commission.

To agree the themes of training courses with PP Department of the SNRC of Ukraine.

To send the reports on the results of training in the field of PP, Accounting, Measurement and Control of NM to the PP Department of SNRCU.

To invite the specialists from the PP Department of SNRCU to the planning process.

Strengthening of cooperation of GKTC and PP Department of SNRCU on international activity in training, participation in the international conferences, meetings, etc.

Systematization of current training courses.

Systematic participation in the training courses would increase their efficiency.

To develop differentiated training programs for different categories of officials involved into PP, accounting and control of material.

To establish the training (retraining) center for the specialists on PP of all levels on the basis of GKTC.

To arrange more courses for the PP personnel of intermediate link.

To increase financial support and possibilities for training of power unit access control engineers-operators.

More often to arrange seminars for intermediate level PP personnel of nuclear facilities.

To provide visiting facilities more often, especially NPPs, for analysis of their needs and requirements in the part of personnel training and refreshing.

It would be advisable to invite experts from the facilities to perform lectures during the courses (brief presentations on the specific features of PP systems operation would stimulate trainees' perception and exchange of experience)

Remarks and Comments on the content of the courses already delivered

Fundamental Course on Physical Protection, 1996.

Regular revision is necessary, taking into account new regulatory documents;
To include presentations on modern methods and systems (equipment);
To upgrade the course because many changes took place in the world and different countries have gained experience on implementation of PP systems for NM and NF;
Highlight modern PP equipment and PP systems applicable to NPPs of Ukraine;
It is necessary to include new developments;
The course needs to be revised taking into account recent events, increase of terrorists acts, new revision of the IAEA Recommendations.

Vulnerability assessment, 1996

It is advisable to concretize the course rendering attention to vulnerability assessment of PP objects of nuclear power engineering industry in Ukraine.

Designing of PP systems

Modern PP technical means and PP systems applicable to NPPs of Ukraine;
The course is to be revised taking into account changes in the legislation and new regulatory documents.

Vulnerability assessment, 1997

To increase practical training.
It is advisable to organize and deliver the course from the point of vulnerability assessment of PP Systems at Ukrainian NPPs;
This course is worth doing when the regulatory document is developed in the State, which determine the concept of vulnerability and the methods of vulnerability assessment

Vulnerability assessment while transporting

For better practical utilization of the course it is necessary to add specific national legislation on PP and radiation protection of nuclear materials transport.
The scope of the course allowed acquiring additional knowledge on the topic.

Development of procedures for accounting, control and physical protection of nuclear materials
June 19- 23, 2000

The scope of training course is sufficient to gain basic knowledge.
Procedures developed for installation require constant upgrading, the experience and advice of colleagues and experts are necessary for this.

Design basis threat

The mechanism of design basis threat development is not regulated in Ukraine
It's advisable to develop and deliver the course from the point of vulnerability assessment of PPS at NPPs of Ukraine .
It is desirable that the trainees understand the idea of threat assessment and be acquainted with methodology of design basis threat assessment.

ADVANTOR Electronic systems

The course requires more fundamental coverage of electronic safety systems applied at different facilities as well as characteristics of new equipment, applied in nuclear power engineering.
Electronic equipment applied for detection of radioactive materials, explosive substances and weapon.
Operational experience is required
More practical training, with regard of features and equipment utilized at the enterprises.
It would be quite good to add to the course practical training on calculations of acceptable risks while PP systems designing

Design basis threat (Part II)

It is advisable to develop and deliver this course from the point of vulnerability assessment of PP systems at NPPs of Ukraine
It would be quite good to add to the course practical training on calculations of acceptable risks while PP systems designing
To include methodology of development of DBT at the level of an object

Detection of vital areas

The scope of the course is sufficient.
The course doesn't require sizeable revision, but the time allocated for practical work with software is not enough.

Detection of vital areas - 2

The scope of training course is sufficient to gain basic knowledge.
The course doesn't require sizeable revision, but the time allocated for practical work with software is not enough.

Analysis and modeling of protection systems

More attention is to be given to practical training
It is advisable to increase the time of practical training.
Wider use of computer techniques for calculation and analysis of PP.
Practical Training on calculations of acceptable risks while PP system designing is advisable.

Emergency situation management

To study American experience more thoroughly, visit to crisis centers in USA.
Deep adaptation of training material to the conditions in Ukraine is necessary (terminology, management structure, etc.)
Closer interconnection of theoretical and practical parts.
Ukrainian side shall have experienced negotiators, who have gained experience in extreme situations, and participate in practical training.
General scheme is the following: training-exercise-prompting-conclusions-training course analysis.
Adaptation to Ukrainian practice and regulatory documents in this field.
It is advisable to revise regarding to NPP.

NEW WORKSHOPS PROPOSED BY THE TRAINEES TO INCREASE THE EFFICIENCY OF WORK

General issues of PP

1. PP measures realization at concrete facilities of nuclear power engineering industry.
2. Organization of PP at NPP.
3. Organization of PP of the objects of 3rd and 2nd categories.
4. Development of PP procedures at a facility, including special verification and access control.
5. Radiation safety and physical protection.
6. Development of PP plan of nuclear facility. Format and content of the plan, assessment.
7. Technical and scientific progress in the field of PP of nuclear material.
8. Vital areas determination and PP assurance.
9. Management of radiation protection systems at a facility.
10. Automated access control system in PP system. Modern approaches.

Technical means of PP system

1. Stationary and portable electronic equipment for detection of radioactive materials, explosive substances, weapon.
2. Expeditious and HF communication at the facilities equipped with PP systems.
3. Modernization of PP systems in connection with up-grading of software support and depending on operational life and safety.
4. Restricted access information protection in automated systems and computer files.
5. Modern PP measures. Operation and service of new technical support systems (TSS) utilized in Ukraine.

Vulnerability assessment and PP testing.

1. Characteristics of delaying elements and their role in organization of PP of nuclear materials and nuclear material.
2. Testing of PP system.
3. Testing of PP system imported and domestic electronic equipment. Methods of testing and failures detection of IPID infrared sensors.
4. Vulnerability assessment of PP systems.
5. Efficiency assessment of operating PP systems.
6. Vulnerability assessment of radioactive waste storage facilities and other sources of ionizing radiation.

Emergency response in crisis situations

1. Process of interaction between competent ministries and institutions during accidents at nuclear facilities and radioactive waste management facilities.
2. Man-caused accident management.
3. Unified state system of accidents and emergency preparedness.
4. Emergency preparedness in case of nuclear terrorism at the facilities of nuclear power engineering industry.
5. Crisis situation management.
6. PP systems management at normal operation and emergency situation.
7. Organization of interaction between PP central control panel operator and response forces.
8. Aspects of physical protection assurance of nuclear materials, nuclear facilities in the conditions of radiation accident.

Anti-terrorists activity

1. Present-day anti-terrorists measures.
2. First actions in occasion of terrorists attack.
3. Planning of anti-terrorists measures.

Aspects of licensing, oversight and inspection activity

1. Licensing of PP systems for NM and NF. Experience of licensing in the field of PP of NM and NF by the example of CIS and Russia.
2. Oversight activity in the field of PP of NM and NF. Inspection of physical protection conditions at nuclear facilities.

PP aspects at the state level

1. Nuclear material safety management (in the State, at a specific installation).
2. On State system of PP.
3. On State policy in the field of PP.
4. International safety standards in the field of PP.
5. Aspects of PP assurance at nuclear objects.
6. Legislative basis in Ukraine on PP, MC&A.
7. Design basis threat. Upgrading of DBT at the state level and at a facility level.
8. Procedure of interaction between competent ministries and institutions during accidents at nuclear facilities and radioactive waste management facilities.
9. Unified state system of accidents and emergency preparedness.
10. Procedure of exchange of data and information in the field of PP with CIS and Eastern Europe countries.
11. Radiation protection and physical protection.

As well, several respondents considered necessary to arrange “Train the Trainers” course.

The following specialists proposed their services as trainers:

- **Konstantin Guschin, SINEI**, topic “ADVANTOR electronic systems for access control and intrusion detection”;
- **Aleksey Slobodiuk, Rovno NPP**, topic “Organization and implementation of emergency exercises. Training of the personnel, teams, brigades in emergency exercises”;
- **Vladimir Bytchkov, Rovno NPP**, topic “Organization of PP Systems Operation at NPP. Operational problems”;
- **Yevgeniy Katunin, Chernobyl NPP**, topic “Integrated PP systems at NPP”;
- **Alexander Elchischev, Chernobyl NPP**, topic ‘Emergency situations and crisis response’.
- **Viktor Dolbyshev, South Ukrainian NPP**, topic “Problems of PP system Identification. Designing of PP system. PP System Assessment”.
- **Ivan Zhebet, South Ukrainian NPP,** topic “Characteristics of nuclear facilities, nuclear materials, radioactive waste and other sources of ionizing radiation. Physical protection requirements to the facilities”.
- **Alexander Karasev, South Ukrainian NPP**, topic “Physical Protection of NM and NF at NPPs”.
- **Igor Kunitsky, State Nuclear Regulatory Committee of Ukraine**, topic Legal and Regulatory basis of Physical protection, Licensing of PP facilities”.
- **Aleksey Ananenko, State Nuclear Regulatory Committee of Ukraine**, topic “International Response System for Radiation Accident”.
- **Boris Landa, Kiev Institute “Energoproject”.** Designing of PP Equipment.
- **Valeriy Kosinov, Scientific and Technical Center, Kharkov Institute of Physics,** Management of information security systems operation.
- **Valeriy Mikhailov, Scientific and Technical Center, Kharkov Institute of Physics,** Concept of Construction of PP Systems.
- **Viktor Kulinich, Zaporizhie NPP,** Computer -Aided Access Control Systems operation.
- **Oleg Makarenko, NAEC “Energoatom”** Upgrading of PP Systems at operating NPPs, Problems and Solutions.
- **Yuriy Kuchmiy, Khmelnitskaya NPP,** ToR development for designing of equipment for PP Systems. Operation and operational management of PP systems.
- **Anatoliy Boyko, Khmelnitskaya NPP,** Trial operation of PP equipment. Operational testing of PP Systems, Subsystems and independent elements. PP system vulnerability assessment and correcting measures. Commissioning and Operation of PP System.
- **Vladimir Rozum, Khmelnitskay NPP,** Characteristics of the utilization of the Data Base Control System (DBCS) in the Access Control Systems. Structure of automated alarm control and display system, features of components interaction. Aspects need special attention when designing intrusion detection systems, authorized access and visual monitoring systems.
- **Aleksey Diakov, Institute for Nuclear Research,** PP Technical Systems.

REPORT

on the visit of group of representatives of George Kusmicz Training Center GKTC) of the Institute for Nuclear Research of National Academy of Sciences of Ukraine to Chernobyl NPP

In accordance with the Contract # 267929 with Sandia National Laboratories, USA, V.Gavrilyuk and S.Trachevskiy have visited Chernobyl NPP on July19-20, 2004, and had technical meetings for reviewing and analysis of the questionnaires sent to Chernobyl NPP former participants of GKTC training courses.

From the Chernobyl NPP side the following representatives took part in the meeting:
Mr. E.Katunin - Deputy Director General on Physical Protection of Chernobyl NPP;
Mr. A.Lutiy – Head of PP Division;
Mr. M.Bykov – Principal Engineer on implementation of PP systems at commissioned objects;
Mr. V.Oshuev – Commander of Military unit # 3041 of MVD; others.
Regarding the clarification of comments given by the former participants of GKTC training courses, all the participants draw attention to the necessity of systematic approach to training of PP specialists. Besides, Mr. M.Bykov (responsible person for implementation of PP systems at commissioned objects) proposed to give more attention to specific national problems during development of training course, and also to take into consideration the issues of interactions between security, nuclear and radiation safety, fire protection, operation safety. Topical question in physical protection is practical implementation of Ukrainian legislation, therefore they would like to have explanations from GKTC on the questions appeared. For this it would be reasonable to send their problematic questions on PP to GKTC before the development of a course, thus GKTC will be able to agree the answers with the regulatory authority (SNRCU). Realization of this would definitely raise the rating of GKTC.
Mr. A. Lutiy asked to add to training courses more practical issues connected with the problems of specific nuclear facilities. Mr. Katunin and Mr. Oshuev expressed their concern on the possibility of terrorists acts at NPP and asked to give more attention to the issues of efficient placing of response forces as well as to guards role in organization of PP of NPP.

V. Gavrilyuk

S. Trachevskiy

REPORT

**on the visit of representatives of GKTC,
Institute for Nuclear Research of NAS, Ukraine,
V.Gavryliuk, S.Trachevskiy to Khmelnitsky NPP**

In accordance with the Contract #267929 with Sandia National Laboratories, DOE, USA, in August 15-18, 2004, representatives of GKTC V.Gavryliuk, S.Trachevskiy have visited Khmelnitsky NPP aiming to discuss the response of GKTC former students to the questionnaire, which was sent to them before by GKTC.

Till recently Khmelnitsky NPP has operated only one power unit (WWER 1000) and in August 2004 the second unit with WWER 1000 was commissioned. This second Unit is the first nuclear installation in Ukraine, which has PP system, developed after implementation of the Law of Ukraine "On Physical Protection of Nuclear Facilities, Nuclear Material, Radioactive Waste, other Radiation Sources". This PP system corresponds to modern international and national requirements to such systems. Acceptance of PP System by the State Commission demonstrated this. Big interest for GKTC representatives was to be familiarized with development process, implementation and first results of PP system operation.

The visit began by the talks with Deputy Director General on PP Mr. Anatoliy Boyko. It has to be mentioned that Mr. Boyko is the only one representative of KhNPP who participated in most of training courses on PP in GKTC (7 training courses). Mr. Boyko has noticed that the training on PP in GKTC was of high importance for his qualification growing. At the same time he cannot deny the importance of self-training.

By the opinion of Mr. Boyko it is necessary to make the future training closer to real conditions of Ukrainian nuclear facilities. These conditions show that at all the sites modern technologies and software are practically implemented into all aspects of activity related to PP of NM and NF. At the same time training of specialists operated technical means of PP is obviously lag behind, especially training of engineers –operators of unit and central alarm stations. It is also necessary, as Mr. Boyko considers, to organize serious refreshing training for specialists on maintenance and repair of equipment of PP system. As well the proposal was given to organize training courses directly at nuclear facilities that allows participants to be familiarized in practice with latest achievements in the field of PP (Mr. Boyko had in mind KhNPP).

Then we had long talk with Head of PP Division Mr. Yu.Kuchmiy. Mr. Kuchmiy has noticed that he urgently needs refreshing training on the topic of efficiency assessment of PPS, taking into account the fact that KhNPP has recently commissioned PP equipment of the 1st unit and just few days ago the 2nd unit. Besides, he is interested in participation in training course on interactions between PP subdivisions and subdivisions responsible for nuclear, radiation safety, fire protection and general technical protection. In addition to that Mr. Kuchmiy considers that it's time to organize not only training courses but also technical meetings where participants could exchange their experience. He also stands for carrying out in Ukraine annual meetings on PP of NM and NF.

Mr. Kuchmiy proposed to implement 1-2 days workshop for top managers of NPP (Director General, Chief engineer, 4 Deputies Director General, Deputy Chief Engineer on Safety). By his opinion this would facilitate the work of PP division at NPP.

Mr. Kuchmiy has complained that for the last time he passed training in KINR in 1997.

We had very interesting talk with Vladimir Rozum, the former student of training course "Determination of vital areas" (part 1 and 2) and "Analysis and modelling of PP system". He is highly qualified specialist; he works as administrator of access control subsystem. Mr. Rozum proposed to develop a new training course "Determination of vital areas of nuclear facility with WWER 1000" on the base of GKTC training course "Determination of vital areas". This could be developed together with another former student of GKTC Mr. Vladimir Didenko (he was

trained at the course “Determination of vital areas”, 1st and 2nd part). Mr. Didenko is Head of PSA Laboratory. GKTC takes into account this proposal if we decide to develop such training course.
Managers of PP at KhNPP have shown to GKTC representatives some subsystems of PP System of the Units 1 and 2.

In final meeting A. Boyko and Yu. Kuchmiy informed that the number of employees in PP divisions increased from 23 to 36 persons, 30 persons of them needs upgrading of their skills. In the future KhNPP plan to complete construction of power units #3 and #4 and the number of PP specialists will grow. We were also informed that NPP Training Center conducts sessions on PP for all categories of specialists without exclusion. They think it would be expedient to train specific instructors who will be in the staff of local TC.

V.Gavrilyuk

S.Trachevskiy

REPORT

**on the visit of representatives of GKTC,
Institute for Nuclear Research of NAS, Ukraine,
V.Gavryliuk, S.Trachevskiy to Rivne NPP**

August 19-21, 2004, in accordance with the Contract #267929 with Sandia National Laboratories, DOE, USA, representatives of GKTC V.Gavryliuk, S.Trachevskiy have visited Rivne NPP aiming to discuss the response to questionnaire, which was sent to them before by GKTC.

At present time Rivne NPP is going to start Power Unit #4 with WWER 1000 to first criticality. At the time of the group arrival technical complex of Unit #4 PP system has passed the State Commission acceptance. "Precommissioning fever" has had certain effect on our visit. Nevertheless, the managers of PP of RNPP have found enough time for us to achieve the goals of our visit.

7 specialists of Rivne NPP were the students of GKTC, 4 persons out of them still work at NPP. We tried to clear up how Rivne NPP specialists on PP upgrade their professional skill.

Our visit began with discussions with Head of PP Division and Specific Work Mr. Aleksandr Beloborody. For the first time he took part in the training course "Fundamentals on PP" as far back as in 1996. This course was delivered by Sandia National Laboratories specialists in KINR. (Totally he has passed 3 training courses, including the course "Determination of Vital Areas", 1-st and 2-nd part) His opinion is that this training has been useful for him as a PP specialist and helped him in his carrier growing. Now he is well qualified specialist on PP. He is one of the "architects" of PP system of Unit #4 Rivne NPP. During the talk RNPP representatives underlined that this system was developed by national organizations only and financed from Ukrainian budget. At the same time Mr. Beloborodiy has noticed that he needs to upgrade his skills, as he said "at real courses about real facilities". He said that during development of technical means of PP system for Unit #4, during assembling and commissioning he gained positive experience, which he could share with specialists from other NPPs in the framework of training courses "Technical means for PP" and "Testing of technical means for PP". As Head of PP Division he feels urgent need for legislation knowledge related to PP aspects. He has informed that after commissioning of new PP equipment sometimes there are misunderstandings/conflicts between personnel of PP Division and other divisions of NPP, especially with representatives of contracting organizations involved into different aspects of preparation to commissioning of new power unit. Having noticed that the same situation exists at other NPPs, Mr. Beloborodiy considers it necessary to establish a post of lawyer in PP Divisions. He underlined the necessity of specific training (1-2 weeks) for lawyers, who would work with legal aspects of PP of nuclear facilities.

Mr. Beloborodiy stressed the importance and timeliness of training of operators for local and central PP control panels. He specially underlined the needs for training of operators in emergency situations.

Head of PP Division considers necessary to train his personnel in different training centers. He said that 10 specialists of Rivne PP Division were trained in Albuquerque, Brno, Obninsk, Kiev – GKTC.

Then GKTC representatives met with Deputy Director General on Regime Mr. Vladimir Bychkov.

Being a lawyer by profession and having big practical experience in the field of PP, Mr. V.Bychkov raised a question on specific legal knowledge necessary for specialists of PP divisions at nuclear facilities of Ukraine. He indicated that it is necessary to develop training material on the issues maximally close to real situation at NPP, with concrete situations and examples of solutions. Besides, as practice showed, managers of NPPs also need training on legal aspects of PP. By the opinion of Mr. Bychkov training course or technical meeting with American experts on legal aspects of PP of nuclear material and facilities would be expedient. Mr. Bychkov proposed to develop training material on legal aspects and procedures of PP.

GKTC representatives were familiarized with some aspects of PP at Rivne NPP.
As well, they have got more specific information about the number of employees in the PP Division at Rivne NPP, at present it is 34 persons.
PP specialists of Rivne NPP proposed to organize annual meetings on PP of nuclear material and facilities with participation of specialists on PP of different categories. 25% of time of this meeting is to be devoted to plenary sessions and 75% of time is to be devoted to section groups. Group meetings should consider the issues related to field of interest of different categories of PP specialists.

V.Gavrilyuk

S.Trachevskiy

Appendix F. Survey of Companies Licensed by Ukraine to Perform Work Related to the Physical Protection of Nuclear Facilities

- **[Staffing and Contact] information about companies**.....F-2
- **Information on the work performed by the companies**.....F-5
- **List of the products made by Ukrainian companies**.....F-10
- **[Discussion concerning licensing of physical protection activities for nuclear facilities in Ukraine]**.....F-11

Table 1. INFORMATION ABOUT COMPANIES

N	Company Name	Company address a. Phone b. Fax c. E-mail	Name of Director; a. Phone b. Fax c. E-mail	Name of Authorized Representative a. Phone b. Fax c. E-mail	Number of Company Staff				Operational Experience in the Field of PP /years/
					Administrative staff	Engineers	Technicians	Workers	
1	Isolated Subdivision of NAEC "Energoatom" - "Atomremontservice" – "Repair and Service of Atomic Equipment"	a. 07100, Slavutich, Kiev region, Pr. Entuziastov, 7 b. +0380 (4479) 2-96-84 c. (04479) 2-48-67 d. ars_pto@slavutich.kiev.ua	Viktor Tonkikh a. 2-54-34 b. 2-54-34 c. ars_pto@slavutich.kiev.ua	Sergey Gerasimov a. 2-97-44, 2-94-02 b. (04479) 2-48-67 c. gera@slavutich.kiev.ua	5	37	2	156	5
2	Close corporation "Ista-Sital"	a. Ukraine, Kiev, Borschagovskaya str., 97A b. +38 (044) 241-84-95 c. 241-84-95 d. office@istagroup.com	Evgeniy Balinsky a. +38(044) 241-84-95 b. 241-84-95 c. office@istagroup.com	Yuriy Antimonov a. +38(044) 241-84-95 b. 241-84-95 c. office@istagroup.com	6	8	5	18	2
3	Company with limited liability Engineering manufacturing firm "Videotechservice"	a. PO box 170, Neteshin, Khmelnitsky region, b. (03848) 6-31-41 c. (03848) 6-31-41 d. vts_guk@pn.km.ua	Ivan Khimka a. cellular phone 8 067 382-41-36 b. (03848) 6-31-41	Pavel Guk a. cellular phone 8 067 382-41-37	4	5	3	21	1-5
4	Company with limited liability "ODESEM"	a. Ukraine, 04074, Kiev, Vyshgorodskaya str., 4, ap.49 b. 295-83-00 c. 295-83-00 d. odesem@ukr.net	Alexander Denisenko a. 295-83-00 b. 295-83-00 c. odesem@ukr.net	Alexander Denisenko a. 295-83-00 b. 295-83-00 c. odesem@ukr.net	28	6	8	122	1,5

5	Company with limited liability Kuznetsovsk fixing installation enterprise	a. Kuznetsovsk b. (03636) 2-28-99 c. (03636) 2-28-99 d. knmp@panda.net.ua	Alexey Shkaboj a. (03636) 2-28-99 b. (03636) 2-28-99 c. knmp@panda.net.ua	Vladimir Mitsak a. (03636) 3-31-54 b. (03636) 2-28-99 c. knmp@panda.net.ua	7	52	22	68	2-15
6	Kiev research and development institute "Energoproekt"	a. 01135, Kiev, Pr. Pobedy, 4 b. 236-09-32 c. 246-59-82	Yuriy Malakhov a. 236-09-32 b. 246-59-82 c. enprojct@kiep.kiev.ua	Boris Landa a. 235-89-05 b. 246-59-82 c. b.landa@kiep.kiev.ua	6	12	6	-	10-23
7	Company with limited liability Kuznetsovsk fixing installation department "Elektroyuzhmontazh"	a. Kuznetsovsk, Rovno region, Ukraine, 34400 b. +38 (03636) 3-89-09 c. +38 (03636) 3-89-09 d. knmu-epm@ukr.net	Misak Kazakyan a. +38 (03636) 3-89-09 b. +38 (03636) 3-89-09 c. knmu-epm@ukr.net knmu-epm@ukrpost.net	Misak Kazakyan a. +38 (03636) 3-89-09 b. +38 (03636) 3-89-09 c. knmu-epm@ukr.net knmu-epm@ukrpost.net	22	19	10	50	3-20
8	Close corporation "Alay"	a. 03150, Kiev Gorkogo str., 84 b. 269-66-56, 268-03-62 c. 268-03-62 d. all@alay.com.ua	Anatoliy Pushkar a. 269-66-56, 268-03-62 b. 268-03-62 c. all@alay.com.ua	Anatoliy Zaburanny a. 416-74-01 b. 416-74-01 c. all@alay.com.ua	6	21	7	19	3-25
9	Corporation "Transexpo"	a. 03150, Kiev, Yamskaya str., 72 b. 461-79-69 c. 249-36-52 d. transexpo@texpo.kiev.ua	Vladimir Mazover a. 249-36-53 b. 249-36-52 c. vim@texpo.kiev.ua	Vladimir Panov a. 461-79-69 b. 249-36-52 c. pvp@texpo.kiev.ua	1	6	4		4-20
10	Company with limited liability "TiSO"	a. 03150, Kiev, Yamskaya str., 72 b. 249-36-55 c. 249-36-55 d. tiso@texpo.kiev.ua	Vladimir Mazover a. 249-36-53 b. 249-36-52 c. vim@texpo.kiev.ua	Vladimir Panov a. 461-79-69 b. 249-36-52 c. pvp@texpo.kiev.ua	3	7	6	30	2-5

11	Company with limited liability “SteelArm”	a. 03150, Kiev, Yamskaya str., 72 b. 249-36-55 c. 249-36-55 d. steelarm@texpo.kiev.ua	Sergey Pitajchuk a. 249-36-55 b. 249-36-55 c. sp@texpo.kiev.ua	Vladimir Panov a. 461-79-69 b. 249-36-52 c. pvp@texpo.kiev.ua	1	5	4	2	3-11
12	Company with limited liability “Transat”	a. 03150, Kiev, Yamskaya str., 72 b. 249-36-45 c. 249-36-45 d. tsat@texpo.kiev.ua	Stanislav Polishchuk a. 249-36-45 b. 249-36-45 c. svp@texpo.kiev.ua	Vladimir Panov a. 461-79-69 b. 249-36-52 c. pvp@texpo.kiev.ua	1	8	2		5-12
13	Company with limited liability “ICK Transexpo”	a. 03150, Kiev, Yamskaya str., 72 b. 461-79-69 c. 249-36-52 d. transexpo@texpo.kiev.ua	Alexander Lukyanov a. 249-36-53 b. 249-36-52 c. laa@texpo.kiev.ua	Vladimir Panov a. 461-79-69 b. 249-36-52 c. pvp@texpo.kiev.ua	2	11	3	27	1-12

Table 2. INFORMATION ON THE WORK PERFORMED BY THE COMPANIES

#	Company name	Licensed activities	Work completed
1	ZAO ISTA SITAL, Inc.	- Technical security systems and information protection systems design for physical protection of nuclear facilities and nuclear materials; - Project development for maintaining physical protection of nuclear facilities and nuclear materials; - Assembly, adjustment, maintenance and repair of engineered and technical security systems and information protection systems for physical protection of nuclear facilities and nuclear materials.	Design development and physical protection systems development for Vector object.
2	Engineering and Production Enterprise VIDEOTECHSERVICE, Ltd.	- Assembly, adjustment, maintenance and repair of engineered and technical security systems and information protection systems for physical protection of nuclear facilities and nuclear materials	Assembly of cable networks, cable constructions and equipment for engineered and technical systems for physical protection of nuclear facilities at Khmelnitsky-1 and 2 and Zaporizhya-1
3	ODYSEM, Ltd.	- Technical security systems and information protection systems design for physical protection of nuclear facilities and nuclear materials; - Assembly, commissioning, maintenance and repair of engineered and technical security systems and information protection systems for physical protection of nuclear facilities and nuclear materials.	Inspection and design of technical security means and engineered and technical protection equipment for Sevastopol Design Institute for Nuclear Energy
4	Kuznetsovsky Adjustment and Assembly Enterprise, Ltd.	- Assembly, adjustment, maintenance and repair of engineered and technical security systems and information protection systems for physical protection of nuclear facilities and nuclear materials; - Commissioning and operation of nuclear facilities; - Assembly, maintenance and adjustment of fire fighting systems equipment; - Assembly and adjustment of electrical devices and automation devices; - Power supply design for communications and information technology electrical equipment - Electrical Laboratory Accreditation Certificate for electrical parameters measurement and testing (PT0022)	- Assembly, adjustment, maintenance and repair of engineered and technical protection means for Rivne nuclear power plant. - Assembly and adjustment of firefighting systems, electrical devices and automation devices for Rivne nuclear power plant.
5	OAO Kiev Research, Development and Design Institute ENERGOPROECT, Inc.	- Projects development for maintaining physical protection of nuclear facilities and nuclear materials.	- Chernobyl NPP, Shelter Object, Complex of physical protection engineered and technical means; - Chernobyl NPP, automated access control system for the personnel working at shelter Object;

			- Rivne NPP, Unit 4 – security alarm system; perimeter protection for the radiation level control automated system.
6	Kuznetsovsky Adjustment and Assembly Administration ELECTROYUZHMONTAZH, Ltd.	- Technical security systems and information protection systems design for physical protection of nuclear facilities and nuclear materials; - Assembly, adjustment, maintenance and repair of engineered and technical security systems and information protection systems for physical protection of nuclear facilities and nuclear materials; - Design, assembly and maintenance fire protection systems; - Construction work: major activities: electrical wiring and startup and adjustment work on automated technical systems; - Measurements in the field of state metrological control and inspection; - Installation of control systems category 5.	- Startup and adjustment work on the equipment for radiation control systems at all Units of Rivne NPP, startup and adjustment of the radiation level control automated system; - Startup and adjustment of communications, fire protection automatics equipment and closed circuit TV systems in the departments of Rivne NPP; - Reconstruction of engineered and technical security means, work performed under the TACIS program.
7	ZAO ALAY, Inc.	- Project development for maintaining physical protection of nuclear facilities and nuclear materials; - Technical security systems and information protection systems design for physical protection of nuclear facilities and nuclear materials; - Assembly, adjustment, maintenance and repair of engineered and technical security systems and information protection systems for physical protection of nuclear facilities and nuclear materials.	N/A
8	TRANSEXPO Corporation	- Project development for maintaining physical protection of nuclear facilities; - Design of technical security systems for physical protection of nuclear facilities; - Assembly, adjustment, maintenance and repair of engineered and technical security systems for physical protection of nuclear facilities and nuclear materials.	- Draft design of physical protection system for Khmelnitsky NPP, units 1 and 2; - Draft design of physical protection system for Rivne NPP, unit 4; - Draft design of physical protection system for (closed circuit TV subsystem) Rivne NPP, unit №3; - Draft design of physical protection system for Zaporizhya NPP, units №№1-6; - Draft design of major repair of engineered constructions at the perimeter of the controlled area of Chernobyl NPP; - Khmelnitsky NPP, unit 1, access control portal 1: supply of video equipment, assembly and startup, warranty and post-warranty maintenance for physical

			protection system; - Zaporizhya NPP, unit 1, Main Control Room: equipment supply, assembly, startup and adjustment and warranty maintenance of the physical protection system; - Rivne NPP, Access control portal-1 and Access control portal-2, unit 3 (closed circuit TV subsystem): equipment supply, assembly, startup and adjustment and warranty maintenance of the physical protection system; - Chernobyl NPP: equipment delivery and assembly of certain elements of the physical protection system of Shelter Object, NPP perimeter and Spent Fuel Storage Facility-2.
9	TiSO, Ltd.	- Technical security systems and information protection systems design for physical protection of nuclear facilities and nuclear materials; - Assembly, adjustment, maintenance and repair of engineered and technical security systems and information protection systems for physical protection of nuclear facilities and nuclear materials	- Khmelnitsky NPP, unit №1, Access control portal-1: assembly, startup and adjustment, warranty and post warranty maintenance of the physical protection system; - Zaporizhya NPP, unit 1, Main Control Room: assembly, startup and adjustment and warranty maintenance of the physical protection system; - Rivne NPP, Access control portal-1, Access control portal-2, unit №3 (closed circuit TV subsystem): assembly, startup and adjustment, warranty maintenance of the physical protection system; - Chernobyl NPP: assembly of certain elements of the physical protection system of Shelter Object, NPP perimeter and Spent Fuel Storage Facility-2; - South Ukraine NPP: equipment delivery, assembly, startup and adjustment, warranty and post warranty maintenance of Access control portal

10	SteelArm, Ltd.	- Technical security systems and information protection systems design for physical protection of nuclear facilities and nuclear materials; - Assembly, adjustment, maintenance and repair of engineered and technical security systems and information protection systems for physical protection of nuclear facilities and nuclear materials.	- Draft design of physical protection system for Khmelnitsky NPP units 1 and 2 - Draft design of physical protection system for Rivne NPP unit 4 - Draft design of physical protection system for Zaporizhya NPP units 1 through 6 - Khmelnitsky NPP, unit 1, Access control portal-1: startup and adjustment, warranty and post warranty maintenance of the physical protection system; - Zaporizhya NPP, unit 1, Main Control Room: startup and adjustment and warranty maintenance of the physical protection system - Rivne NPP, Access control portal-1 и Access control portal-2: startup and adjustment and warranty maintenance of the physical protection system
11	Transat, Ltd.	- Technical security systems and information protection systems design for physical protection of nuclear facilities and nuclear materials; - Assembly, adjustment, maintenance and repair of engineered and technical security systems and information protection systems for physical protection of nuclear facilities and nuclear materials.	- Draft design of physical protection system for Khmelnitsky NPP units 1 and 2 - Draft design of physical protection system for Rivne NPP unit 4 - Draft design of physical protection system for (closed circuit TV subsystem) Rivne NPP unit 3 - Draft design of physical protection system for Zaporizhya NPP units 1 - 6 - Khmelnitsky NPP, unit 1, Access control portal-1: startup and adjustment, warranty and post warranty maintenance of the physical protection system; - Zaporizhya NPP, unit 1, Main Control Room: startup and adjustment and warranty maintenance of the physical protection system Rivne NPP, Access control portal-1 and Access control portal-2: startup and adjustment and warranty maintenance of the physical protection system; Rivne NPP, Access control portal-1, Access

			control portal-2, unit 3 (closed circuit TV subsystem): assembly, startup and adjustment and warranty maintenance of the physical protection system;
12	ISK TRANSEXPO, Ltd.	- Technical security systems and information protection systems design for physical protection of nuclear facilities and nuclear materials; - Assembly, adjustment, maintenance and repair of engineered and technical security systems and information protection systems for physical protection of nuclear facilities and nuclear materials.	- Khmelnitsky NPP, unit 1, assembly of the physical protection system equipment; - Chernobyl NPP assembly of the equipment for certain elements of the physical protection system of Shelter Object, NPP perimeter and Spent Fuel Storage Facility-2
13	PP ATOMREMONTSERVICE	- Construction work; - Use of sources of ionizing radiation; - Technical security systems and information protection systems design for physical protection of nuclear facilities and nuclear materials; - Assembly, adjustment, maintenance and repair of engineered and technical security systems and information protection systems for physical protection of nuclear facilities and nuclear materials; - Design, assembly and maintenance fire protection systems; - Provision of services to educational institutions in the field of professional training at the level of qualification requirements for course training and advanced skills training; - Special permit for work performance in the exclusion zone;	Spent Fuel Storage Facility-2, Chernobyl NPP, Shelter Object
14	Scientific and Production Center SPETSATOMENERGO	-	

Table 3. List of the Products Made by Ukrainian Companies

#	Company name	Material and Technical Basis	What the company produces
1	ZAO ISTA SITAL, Inc	Available	- Electromagnetic locking devices for access control systems; - Radio devices and systems for registration, collection, processing and archiving of information from remote moving and stationary objects.
2	Engineering and Technical Enterprise VIDEOTECHSERVICE	Available	Control sample of a new radio-beam device for perimeter security and building security (unified output signal).
3	ODYSEM, Ltd.	Not available	No production
4	Kuznetsovsky Adjustment and Assembly Enterprise, Ltd.	Available	Metal constructions of capacitive antenna devices, equipment boxes (panels), switchboard units, embedded metal constructions and constructions for installation and mounting of engineered and technical security means. (Product range expansion is possible)
5	OAO Kiev Research, Development and Design Institute ENERGOPROECT, Inc.	Not available	No production
6	Kuznetsovsky Adjustment and Assembly Administration ELECTROYUZHMONTAZH, Ltd.	available	Perimeter security antenna systems, lighting fixtures/posts constructions, closed circuit TV posts constructions.
7	ZAO ALAY, Inc.	available	Security control receivers, fire/security and fire alarm systems, announcers/detectors for security and fire protection purposes, perimeter security technical equipment, access control system devices, mounting accessories, cable/wire products
8	TRANSEXPO Corporation	available	Physical barriers in the form of tourniquets, fences, emergency exit doors and portal cabins of various kinds; Access controllers and security alarm controllers, special comprehensive systems for receipt, processing and storage of information from closed circuit TV systems; Special type software
9	TiSO, Ltd.	available	Tourniquets, fences, emergency exit doors and portal cabins of various kinds;
10	SteelArm, Ltd.	available	Access controllers and security alarm controllers, special type software
11	Transat, Ltd.	Available	special comprehensive systems for receipt, processing and storage of information, special type software
12	ISK TRANSEXPO, Ltd.		
13	PP ATOMREMONTSERVICE	available	Metal constructions for lighting systems, fences and sensors installation, cable routing, ducts.

Report

on completion of Task 1 of Contract 188728, dated 09/23/03
between Sandia National Laboratories (USA) and
Kyiv Institute for Nuclear Research (Ukraine)

In Ukraine, the issues of physical protection of nuclear materials and nuclear facilities are governed by the Law of Ukraine "On Physical Protection of Nuclear Facilities, Nuclear Materials, Radioactive Waste and Other Sources of Ionizing Radiation" and by a number of regulations and rules. The primary law in the field of nuclear activities in Ukraine is the Law of Ukraine "On the Use of Nuclear Energy and on Nuclear Safety".

At this time, Ukraine has 4 nuclear power plants producing electricity (Zaporizhye – 6 VVER-1000 units, South Ukraine – 3 VVER-1000 units, Rivne – 1 VVER-1000 unit and 2 VVER-440 units, and Khmelnitsky – 1 VVER-1000 unit), and three Chornobyl RBMK-1000 units are now in the process of decommissioning. At the site of Chornobyl NPP, there is the fourth, destroyed unit of Chornobyl NPP, known as Shelter Object. The construction of Khmelnitsky unit 2 and Rivne unit 4 is nearing the end. Both units operate VVER-1000 reactors. There is a plan to complete the construction of Khmelnitsky units 3 and 4. At this time this construction is frozen. In addition to that, Ukraine has two research reactors: at the Nuclear Research Institute of the National Academy of Science of Ukraine and at Sevastopol National Institute for Nuclear Energy and Engineering of the Ministry of Fuel and Energy of Ukraine. National Scientific Center Kharkiv Physics and Technology Institute of the Education Ministry of Ukraine has some nuclear material in the form of certain single specimen and in bulk form.

Ukraine also operates uranium ore mines and an ore enrichment plant.

Pursuant to the legislation of Ukraine, clearance for work with nuclear material and on nuclear facilities is only issued to the persons who wish to work in the field of nuclear energy and who filed applications with their comprehensive background information subject to positive conclusions based on results of special checks of such information (Article 64 of the Law of Ukraine "On the Use of Nuclear Energy and on Radiation Safety").

Professional activities in the field of nuclear energy in Ukraine is permitted only after the receipt of a license for certain types of activities associated with nuclear activities. The licenses for the types of activities associated with physical protection of nuclear facilities, nuclear materials, radioactive waste and other sources of radiation are now issued by the State Nuclear Regulatory Committee of Ukraine (Article 25 of the Law of Ukraine "On Physical Protection of Nuclear Facilities, Nuclear Materials, Radioactive Waste and Other Sources of Ionizing Radiation").

Over the years of Ukraine's independence, the country has performed a significant amount of work aimed on bringing the physical protection of nuclear facilities of Ukraine in compliance with the norms and rules of Ukraine, IAEA recommendations and, since December 1, 2000, in compliance with the Law of Ukraine "On Physical Protection of Nuclear Facilities, Nuclear Materials, Radioactive Waste and Other Sources of Ionizing Radiation".

The following types of activities in the field of physical protection of nuclear materials and nuclear facilities are subject to licensing in Ukraine:

- Development of the physical protection systems design for nuclear facilities and nuclear materials.

- Design of engineered and technical security means and information protection systems for the information related to the physical protection of nuclear facilities and nuclear materials.

- Assembly, adjustment, maintenance and repair of engineered and technical security means and information protection systems for the information related to the physical protection of nuclear facilities and nuclear materials.

- Training, advanced training and skills improvement training of the specialists in the field of physical protection of nuclear facilities and nuclear materials.

In the early years of Ukraine's independence, the measures aimed on improvement of physical protection of nuclear materials and nuclear facilities, were performed mainly on the account of foreign countries' financing. Lately, a certain part of the activities in the field of physical protection improvement has been financed by Ukraine. At this time, all work associated with physical protection on sites of nuclear facilities are performed by Ukrainian professional personnel.

Ukraine now has a number of companies capable of performing the required work in the field of physical protection on a professional level that conforms with the existing requirements. The goal of this work was to determine such companies and research into their capabilities.

The first step included the development of a list of the companies that are licensed for work in the field of physical protection of nuclear facilities and nuclear materials. We distributed questionnaires to such companies to inquire about the activities of these companies. The filled-out questionnaires were sorted out to form a consolidated table with companies information.

The list of companies, their addresses, management information and other general data was included into table 1.

The types of licenses obtained and the types of work in the field of physical protection performed by each of these companies were included in table 2.

Table 3 demonstrates potential and capabilities of Ukrainian companies with regard to production of certain elements and assemblies of engineered and technical means of physical protection.

Main foreign suppliers of Ukrainian facilities are following:

- BOSCH Security Systems (factories of former BURLE in USA) – CCTV systems;
- AVENIR (Japan) (SEIKO Optical Corporation) – CCTV systems optics;
- AMX Corporation (USA) – management centers;
- TERN, Inc. (USA) – industrial controllers;
- Keri Systems, Inc. (USA) – access control system readers, controllers, individual cards;
- GARRETT (USA) – metal detectors;
- HP (USA) – computer and peripheral equipment;
- Microsoft, Oracle, Borland – software.

The analysis of the suppliers that deliver primary physical protection equipment to Ukraine's facilities demonstrated that there are two major advantageous companies here: the US corporation ADVANTOR and Russian Company ELERON.

It is necessary to say that during the work performed under the contract it was determined that to provide for successful operation of Ukrainian companies it is essential to develop and approve the "Unified Standards for Design of Engineered and Technical Means of Physical Protection of Nuclear Materials and Nuclear Facilities". The development the "Unified Standards" is being hindered by the lack of proper budget funding.

This Report indicates that works under reporting Task 1 were completed successfully

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December 24, 2003