

**NUCLEAR SECURITY CULTURE
ANOTHER STEP TO NUCLEAR SECURITY**

by

Stanislav Sashenko

Kharkov Institute of Physics and Technology of NAS of Ukraine

sashenko@kipt.kharkov.ua

Abstract: Although the nuclear weapons non-proliferation mode allowed the international community to achieve sufficient success, today, the international community meets a number of problems in the area of peaceful use of nuclear energy, exclusion of getting of the nuclear materials and technologies into the hands of terrorist organizations. At present time, it can already be acknowledged that the threat of nuclear materials and technologies proliferation and their use for the purpose of nuclear weapons of mass destruction creation will exist forever. One of the constituents of nuclear security is the nuclear security culture which influences the behavior. The purpose of this work is to study the main elements of nuclear security culture, the necessity of its development and factors influencing its formulation and strengthening in the enterprises of nuclear sector.

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1. Introduction

Although the nuclear weapons non-proliferation mode allowed the international community to achieve sufficient success, today, the international community meets a number of problems in the area of peaceful use of nuclear energy, exclusion of getting of the nuclear materials and technologies into the hands of terrorist organizations. At present time, it can already be acknowledged that the threat of nuclear materials and technologies proliferation and their use for the purpose of nuclear weapons of mass destruction creation will exist forever. The existing threat can be explained by the wish of the certain terrorist groups to obtain nuclear weapons to use it in their selfish ends, and the policy of some states, substantiating at least two reasons of the necessity of creating and possessing of nuclear weapons:

1. Perception of the international legal basis of non-proliferation of nuclear weapons, as discriminating – a position of states at which the Nuclear Weapons Non Proliferation Treaty is considered to be unequal to the non-nuclear states and has discrimination character against the Third World countries, which have the legal right for their own self-defense;
2. Permanent instability of the political situation in the regions of Near East and Middle East, absence of possibilities to know and estimate to a high degree of accuracy the possible hostile activities of the neighbor states, mutual distrust between the states may encourage the region state governments to develop national and military security with use of nuclear technologies. The interest in obtaining of the nuclear weapons of such countries as Egypt, Saudi Arabia and probably Algeria may increase in case of abrupt destabilization of the situation in the Near East.

Also, despite the bitter experience of the tragedy in Chernobyl, at present time we are witnessing the so called nuclear Renaissance – the nuclear energy continues developing. So two absolutely different processes – counteraction to nuclear terrorism and development of nuclear energy, will be obviously developing within some period simultaneously and the main task of international community is that the trajectories of their development could never intersect.

2. Non-proliferation regime in Ukraine – a complicated set of measures and guarantees

In view of the mentioned above problems, the states supporting the course of international security without developing and implementation of nuclear weapons, carry out a number of preventive measures in different areas of activities connected with use of nuclear materials, technologies and goods which could be used for creation on weapons of mass destruction. So, on the example of Ukraine we will view the main elements of state policy on prevention of illicit trafficking of nuclear materials and technologies and their getting into the hands of terrorists.

Mining of nuclear materials – regulated by law of Ukraine “On mining and processing of uranium ores”#645/97 from November 11, 1997. The law covers the following areas:

- geological exploration of uranium-ore deposits;
- designing, allocation, building reconstruction, bringing into exploitation, liquidation, preserving of uranium objects;
- transportation of uranium ores and processing products;
- behavior with sources of ionizing radiation in the process of exploration, mining and processing of uranium ores;
- purchase, realization, export and import of uranium, ores and products of their processing
- organization of account of uranium ores and products of their processing, control on their storing and transportation

State regulation of the mentioned above measures includes: setting of standards and rules of security, determination of volumes of mining, licensing, control on use uranium ores and products of their processing, their transportation, purchase, sale, export and import.

Decision on uranium ores export licensing is taken by a specially authorized state authority in the area of export control. Export license can be issued only to the countries which do not possess nuclear weapons (countries determined by Non-

Proliferation Treaty) after receiving of the official guarantees of the import state body on:

- non-use of the obtained materials for production of nuclear materials;
- providing of measures of physical protection on the levels recommended by IAEA

Physical protection of nuclear materials is regulated by law of Ukraine on “Physical protection of nuclear materials, radioactive waste and other sources of ion irradiation” from October 18, 2000 #2064-III. The law determines the basic principles of the activities of individuals or legal persons on physical protection of nuclear facilities, nuclear materials, radioactive sources and other sources of ion radiation with the aim to protect the interests of national security, prevention and termination of acts of nuclear terrorism, theft or any other illegal extraction of the nuclear material, radioactive waste, other sources of radiation, and also strengthening the nuclear weapons nonproliferation regime. In accordance with the law the aims of system of physical protection system are:

- Creation by the state of conditions, which make impossible the nuclear terrorism acts, nuclear materials, radioactive waste and other sources of radiation theft and also strengthen the nuclear weapons non-proliferation mode.
- Supply of necessary informational and technical support to the bodies which carry the investigation and search operations in order to return the lost nuclear materials and other sources of ion irradiation. The law recognizes physical protection as one of the elements of providing the national security of Ukraine.

Transfer of nuclear materials and technologies – “Law of Ukraine on state control on international transfer of goods of military and dual use” #549-IV from March 20, 2003. The main aim of the law is counteraction against the illegal transfer of goods, which can be used for creation of weapons of mass destruction (nuclear, chemical, and bacteriological) and delivery systems, and also exclusion of usage of the mentioned goods in terrorist purpose. In accordance with the law the principles of state policy in the area of export control are formed according to the following main principles:

- Priority on national interests of Ukraine, political, economic and military, protection of which is necessary for providing the national security;
- Obligatory fulfillment of international obligations of Ukraine concerning non-proliferation of weapons of mass-destruction.

International obligations of Ukraine in the area of nuclear weapons non-proliferation are stipulated by Ukraine participation in the corresponding agreements and conventions, and also by membership in multilateral regimes of export control. Ukraine is a participant of such agreements and conventions as Agreement on non-proliferation of nuclear weapons (ratified 1994), Agreement on Overall Prohibition of Nuclear Tests (ratified 2000), of all multilateral international regimes of export Control, which include “Wassenaar Arrangement”, regime of control of goods of nuclear area “Nuclear Suppliers Group”, “Missile Technology Control Regime” “Australia Group”

- Implementation of export control only in those volume, which is needed for achieving of its purpose – this principle means, that actions connected with export control, can not in any way interfere with the activities of entities concerning the international transfer of goods, on condition that such transfers will not contribute to the activities, directed on creation of weapons of mass-destruction, and the use of the mentioned goods in terrorist aims. The methods of export control are:
 - Goods identification – definition of correspondence of certain goods to the name and description of goods, included in the list of controlled goods.
 - Licensing;
 - Customs control;
 - Sanction and fines implementation in case of violation of law.

Thus it can be stated, that till present time Ukraine achieved a great progress in the regulation of nuclear area starting from the stage of mining of nuclear materials to their transfer. However, nuclear safety and security cannot be reached only by means of legislation, no matter how perfect it is which are complex aims: technical, legal, administrative, institutional, economic, social, political, information and even ethical and psychological.

3. Nuclear security culture

Terrorists do not have any restrictive factors and by case they will use any available means for achieving their purpose. Terrorists may try to obtain nuclear and radioactive materials, and also connected technologies on the objects with low or insufficient level of nuclear security, especially in the objects where negligence is observed and there is a possibility to find abettors ready to make an official crime for monetary benefit. It means that only by means of technical control it is rather difficult to achieve the necessary level of nuclear security and safety. Improvement not only of the technical qualification, but also of the staff motivation together with readiness to use new technical means, should become the basis of nuclear materials and technology safety and security.

Such aims can be reached by means of development, implementation, and consolidation in the organizations of nuclear sector of “the culture of nuclear safety” or to be more precise, inclusion the “culture of nuclear safety” into the organizational culture. In the report of board of directors of IAEA in 2001 “Fundamental principles of nuclear objects and materials protection” the presence of adequate culture of security is considered as one of the twelve principles of creation of effective security system of fissile materials – “all organizations, exploitation the physical protection systems must pay prior attention to issues of security culture, its development and support in the volume necessary for effective realization in the whole organization”.

“Organizational culture” has been studied by scientific management for a long time. It has been noticed that aiming to change the corporate strategies, broaden the presence on the market and to obtain technological advantages; the leading companies carry some special changes inside the company. Although the strategy, market presence and technologies are undoubtedly very important, the leading companies put on the top another force. It appears due to the possibility of an absolutely unique corporate culture to reduce the level of staff uncertainty (or in another words make common for all staff system of interpretation easier), create public order (that is to bring clarity into the expectations of the staff members),

provide integrity (by means of key values and standards interpreted by all as eternal and transferred from generation to generation), create feeling of participation in the general activity by connecting the staff members in one entity and through light on the future thus given the energy charge for moving forward. So the organization derives its strength from development and competent management of corporate culture. Organization culture includes three levels:

- Individual level – organization culture becomes apparent in those cultures, which the individuals bring into organization from the cultural environment, in which people grew up and passed through the process of socialization;
- Intraorganisation level – culture existing inside the organization that is among people working in the departments inside the organization. This level is mostly corresponds to the one which is now called organization culture. It includes rules, every-day practices, such policy in the area of human resources, salary, career growth, discharge and also non-written rules.
- Interorganisational level – appears as the organizations do not exist in vacuum. Quite the contrary, they exist together with other organizations inside the country and abroad, and their existence to a large degree is stipulated by this circumstance. On this level culture includes a number of explicit (in the form of national and international regulating laws) and implicit (informal) rules, determining how the organizations correlate with each other.

At present time strategies of non-proliferation include the three main components:

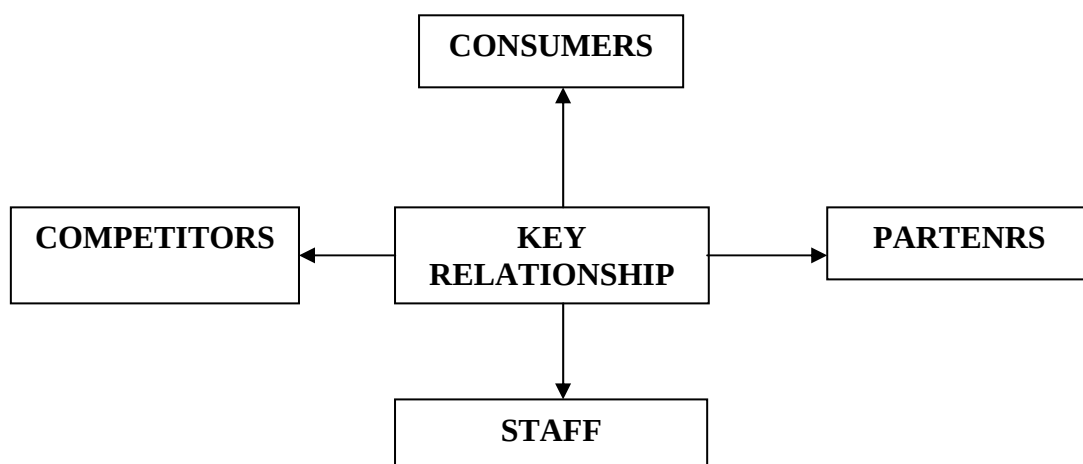
- Providing the security of nuclear materials in the places of their storage – is considered to be the basic method of non-proliferation providing;
- Detection and suppression of attempts of transfer of nuclear materials through the borders, in case of leak of nuclear materials from the storage;
- Provision of employment of nuclear specialists, use of their experience for peaceful purpose in order to prevent the attempts of transfer of nuclear materials and technologies to terrorists groups.

All these three components influence the culture of nuclear security positively and more attention should be paid to the culture of nuclear safety at the stages of developing the preventing measures on this three directions.

Security culture supposes not just the technical competence and professionalism, connected with nuclear technologies and materials, but their wish to follow the established rules, measures and procedures, creatively and initiatively come to the issues of security in emergency situations, including their ability to foresee the rising of problems and circumstances – which is very important in conditions of lack of specialists capable to foresee the character of new threats.

Nuclear Security Culture has been recognized by IAEA as an important component of security and at present time an IAEA implementation Nuclear Security Culture – Implementation Guide has been published, however this concept is still actual and discussed by international community. As it was already mentioned the effectiveness of nuclear security depends not only on the equipment, structure and quality of the process but on the behavior and actions of the personnel, connected with issues of nuclear safety. In other words, the basic idea of nuclear security culture is – the level of effectiveness of the whole nuclear security system in many aspects depends on motivation, professionalism, world outlook, organization climate and other personnel characteristics.

In order to achieve high results in development of security culture on the nuclear enterprises – the transformation from the concept of “nuclear security by special department\state body” to the concept of “nuclear security based on relationship of all participants of the production process of the enterprise”. Basic relationship of the organization of nuclear sector is presented on the Scheme #1.



Scheme #1 Key relations of the organizations in achieving the security culture.

Revision of the attitude of improving the security of nuclear materials on the enterprises can result in necessity of carrying a number of changes inside the organization. In such situation the process of transformation should not have radical character, as can result only in strengthening of control on behalf of the management staff, which will result in counteractions by personnel, low motivation. Such situation in the scientific management is called the control vicious circle, which will not contribute the development and strengthening of nuclear security culture. In case of necessity of carrying the organization changes in order to form and strengthen the security culture a number of constituents should be taken to attention:

- **Scale** – changes of which scale are needed, how this changes will influence the organization teams and groups. The depth of the needed interference should be estimated on that stage, which depends upon the problem to be solved by the organization, determining by this if it is connected with the present-day behavior symptoms, with structural demands or cultural context of the organization, or with the combination of all these factors.
- **Terms** – what is the level of urgency, how many possibilities can be used, before the obtained results will be declared. Quick changes may need directive approach to the changes – accurate plan, quick fulfillment, minimum of personnel involving. In contrast to quick changes strategies a strategy of participation can be presented, such changes pass by slowly, have less clear initial plan, significant attention is paid to involving of personnel into the process of changing and also minimization of opposition and resistance. The two approaches can be presented by means of continuum (Fig.#1)

Fig.#1 Continuum of term of changes.



QUICK	SLOW
-precisely planned	-research approach the forming of plan in the process discussions
-weak involvement of other people Attempts to overcome opposition	-considerable involvement of other people - attempt to decrease opposition

Power and readiness – how much power does the leader have to impose changes. The more potential sources of opposition there are, the more intensive should be work of the leader at determination of the most important interested parties and creation of wider trust confidence before process of changes starts.

Possibility and capability – whether organization has necessary resources to carry out changes, capability means skills and competences necessary to control the program of changes. Effective conduction of changes, to a greater extent, depends on the following factors: planning and setting of objectives, correct use of different communication means, skills of interpersonal communication, understanding of own peculiarities and susceptibility to feelings of other people, negotiations on resource issues and understanding of political situation. These peculiarities of control should not be concentrated in one person or in specific division; they should be correctly distributed throughout the organization.

Preservation – in the stream of total enthusiasm of changes it is easy to lost traditionally strong sides that could cause not only discontent and opposition from those who invested a lot into their creation in their time, but also could mean that organization loses possibility to preserve succession and construct a good practice, thus, it is necessary to estimate what works well in this situation, what contributed from the past into success and how these elements could be preserved.

4. Basic principles of nuclear security culture.

1. Everyone is personally responsible for nuclear security and understands its input in final result.
- the line of power and responsibility for the security is defined from managerial stuff to each employee of the organization. This strategy should be implemented also to the organizations known as interested parties of the nuclear facility (fire-brigades responsible for fire-safety of the nuclear organization, medical institutions and inspections giving the certificates to the nuclear object staff).
- all personnel understand the importance of security standards and possible results of their violation.

2. Managers of all levels demonstrate their commitment to nuclear security
 - managers consider staff perspective in understanding and analyzing issues
 - Basic principles, possible consequences, potential problems are communicated timely and clearly to staff.
3. Trust penetrates the organization.
 - staff is treated with respect
 - opinions of staff are welcomed and are taken into account
 - staff is timely informed about management decisions and their basis
- 4 Decision making reflects the issues of security.
5. Questioning attitude is cultivated.
6. Clear Information policy and organizational continuous learning are embraced.
7. Nuclear security undergoes constant examination in order to discover strong and weak aspects of the system.

5. Conclusion.

Thus, despite the existing developed models and demands to the development and strengthening of nuclear security culture, the process of nuclear culture formation can not appear only by introducing of written rules and orders. Abrupt imposing of orders, on the contrary may last in opposition, reduction of motivation, which will threaten the security system. Process of nuclear security culture formation demand complex approach from the managerial stuff, preliminary analyses of the peculiarities of existing systems, study of the experience of the similar organization within the country and abroad, using the up-to-date methods management methods, development of activities plan on the evolution of security culture, definition of the interested parties and possible opposition of the process of changes. One of the main principles of nuclear security culture is based on the principle that basic standards and criteria should be understood equally in different countries. Moreover in the age of international terrorism and transparent borders between the countries development of the common security criteria will help to establish unified effective standards, preventing the entering of nuclear materials into the hands of terrorists. At the

same the approach of different countries will differ depending on historical peculiarities of the countries, their tradition and professional culture. Involving of specialists in management, psychology together with nuclear scientists is also important in order to develop the precise plans of changing carrying, with an obligatory including of such aspects: clear understandable and available to all interested in nuclear security parties policy in the area of human resources, involvement of personnel, flexibility (possibility to react and adapt quickly to the new demands, threats and challenges), development of networks of obtaining the feedback, development of team work, responsibility, professionalism etc.

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