Contribution ID: **90** Type: **Oral**

Mechanism of Identification of Seized Materials without Creation of Nuclear Forensics Library

Wednesday 9 July 2014 12:10 (20 minutes)

Identification of seized nuclear or other radioactive materials, determination of its origin and possible designation are the parts of any investigation, which can be associated with illicit trafficking of such materials. Such investigation includes comparison of characteristics of the seized materials or the detected trace amounts of unknown materials, which are determined in the result of its analysis, with the data about known materials.

Creation of national nuclear forensics libraries is considered as a unique instrument for identification of seized materials at some international conferences, workshops and meetings, in corresponding documents. In the draft [1] national nuclear forensics libraries are posed even like main element of the infrastructure of the national nuclear security system.

However the approach to identification of unknown nuclear or other radioactive materials by using national nuclear forensics libraries is characterized by a set of inherent imperfections:

• Comparison of the results of analysis of seized material or trace amount of material with information from data bases.

There is known that some very similar materials can be manufactured at the different facilities. At the same time analyses of the same material in different laboratories can provide not the same results. Moreover analyses of the same material in the same laboratory, but in different times and/or by using different techniques can provide not the same results. Therefore material cannot be undoubtedly identified on the result of such comparison, and some discomfiture can arise in the court.

• Accumulation of a lot of information, including sensitive information, in additional point enlarges the circle of knowledgeable people.

It increases the risk of unauthorized sharing of information;

• List of characteristics, which should be measured for characterization of nuclear materials, is not determined until now. But right now it is clear ([2] for example), that databases, which are created for technological control, at best contain only small part of forensically significant information. On the other hand it is considered for instance the possibility of measuring of the contents of a lot of chemical elements (up to 64) for identification of UOC [3]. Therefore creation of comprehensive database is very labour intensive and resource process. And due to the absence of the epidemic of nuclear security events this creation may be unreasonable;

• Discussed concept of national nuclear forensics libraries [1] reflects simplified understanding of forensic database. "Forensic database"means not only that it is used during criminal investigation. A set of specific requirements is inherent to forensic database. First requirement is periodic actualization of database on the whole range of materials, which are currently manufactured. Secondly, database should contain information about intermediate products of manufacturing, etc.

These imperfections force to seek other approaches to identification of seized unknown nuclear or other radioactive materials.

One of the alternative approaches based on the involvement of experienced experts to estimation and analysis of measured characteristics of seized materials or its trace amounts as well as on the subsequent implementation of comparative investigation of both: seized and suspected materials at the same time in one or several nuclear forensic laboratories.

Involved experts should have knowledge and experience of handling with materials of corresponding type. They will be able to determine the possible type (types) of seized material, the group of materials, which can be suspected as the origin for seized material. Experts will be able also to choose materials for comparative investigations, to assess the significance of differences in measured characteristics of seized and suspected materials or seized material and information from suitable databases. Expert evaluation can be based on the knowledge of the details of manufacturing technologies, operational features, knowledge of the sources of raw materials for different manufacturing, etc.

Such approach is realized, for example, in Russian Federation. Russian Federation has a large range of nuclear and radioactive materials and owns a lot of technological databases, which are not concentrated on one side. This approach in Russian Federation focuses on the Russian legislation and does not require additional management and centralization.

By the way exercise "Galaxy Serpent"shows that assessment of the significance of differences between the results of analysis and information from database can require involvement of experts even if the comprehensive database is accessible [4].

REFERENCES

1. Draft of the NST018 "Development of a National Nuclear Forensics Library". IAEA, 2013, 43 p. (http://www-ns.iaea.org/security/nuclear_security_series_forthcoming.asp)

2. Description of the invention to the patent RU 2 269 115 C2, 2006, 10 p.

3. Recommendations of Technical Meting on Analysis of Trace Elements in Uranium Samples, IAEA, 29-30 May, 2012

4. J. Borgardt. Galaxy Serpent Overview. Presentation at the ITWG-18 Meeting, St.-Petersburg, Russia, 8-10 October, 2013

Author: Dr STEBELKOV, V (Laboratory for Microparticle Analysis, Russian Federation)

Co-authors: KUCHKIN, A. (Laboratory for Microparticle Analysis, Russian Federation); KRYUCHENKOV, V. (Laboratory for Microparticle Analysis, Russian Federation)

Presenter: KOCHEV, G. (Russian Federation)

Session Classification: Technical Session 3C