

Radiological preparation and practical radiological culture

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Abstract. The territory of Belarus was severely hit by accident at the Chernobyl nuclear power plant in 1986.

The group of stakeholders from Slovakia visited Institute of Radiology in Gomel in the framework of the NERIS-TP Project of the Euratom FP7 (GA 269718) partly funded by the European Commission. The main goal was to share the experience on the process, methodology and tools used for the improvement of the radiological preparation and practical radiological culture of population living at the long term contaminated area.

The visit started at the Institute of Radiology in Gomel, continued in Bragin district and ended in Pinsk. The Operating centers for practical radiological culture at different villages in Bragin district presented their activities. The evolution of the measurement centers, their equipment, availability to public, current position and location was studied.

Key words

Radioactivity, contaminated areas, practical radiological culture.

Introduction

Technical visit of stakeholders group from Slovakia to Belarus within the WP3 activities in the framework of the NERIS-TP Project of the EURATOM FP7 (GA 269718), partly funded by the European Commission, was held at the beginning of June 2013. Research Institute of Nuclear Power Plants (VUJE) in Trnava on the Slovak side, and Institute of Radiology (RIR) in Gomel on the Belarus side arranged this visit. Both institutes participate on the forums where national, regional and local participants learn the most essential lessons in relation to post-accident management and rehabilitation with the main goal of improvement both national and local plans for preparedness and recovery. The technical visit to Belarus will interact strongly with the European NERIS Platform through WP1 activities for the mutual benefit of all participants.

NERIS (European platform on preparedness for nuclear and radiological emergency response and recovery) was established in June 2010 in Helsinki.

The main goal of this visit was to share experience on the process, methodology and tools used for the improvement of the practical radiological culture of population living for a long term in the contaminated area. Participants were interested in the evolution of the measurement centres, their development, equipment, their availability to public, their current position and location.

Centres in bigger and smaller settlements (towns and villages) were visited. Members of group were discussing with health authorities at different levels, with teachers and with young generation.

The program of visit started at the Institute of Radiology in

Gomel, continued in Bragin district and ended in Pinsk. The operating centres for practical radiological culture were presented at different villages in Bragin district – Luninec and Bulka. Visits to the operational Centres for Practical Radiological Culture were organized together with the presentations related to the education of population and improvement of their radiological preparedness and practical radiological culture. Members of group participated at the international science conference “Questions of radiological and nuclear safety and tasks of Chernobyl and Fukushima“ at which experts from Fukushima took part.

System of public radiation control in Belarus

Accident at Chernobyl Nuclear Power Plant has seriously threatened radiological safety of citizens in Belarus. To minimize such kind of risk the system of radiological inspection was established.

The system consists of:

- Local centres of the radiation control

They are created on request of local authorities by Ministry of Emergency Situations. They are responsible for official decisions and adoption of countermeasures.

Objectives: provide the local population and food cooperatives with possibility to perform measurements on their food products for consumption.

- Centres of practical radiological culture

They are created at schools in contaminated regions. They are well-equipped by modern measuring devices.

Objectives: increase of radiological awareness, practical training in principles of radiation protection, measurement of contamination in farmer and forest products, proposals to the local authorities of taking countermeasures to decrease the radiation rates from agriculture products by different use of the contaminated land.

Practical results

- Creation of public radiological control system and monitoring in the regions affected by Chernobyl accident.
- Increase of confidence among local people in the results of radiological inspection.
- Decrease of dose rate as a result of practical radiation protection.



Radiation Monitoring in Belarus

Besides radiation inspection, the radiation monitoring of environment is very important.

The system supplies all levels of authorities by information about contamination of environment.

Monitoring network is operated by Hydro-meteorological Department of Ministry of natural resources and protection of the environment and consists from:

- 11 monitoring sites for measurement of gamma dose rate one time per day,
- 11 monitoring sites for fallout,
- 9 monitoring sites for gross beta radiation.

Automatic system of radiation control was introduced in 2003-2004. Seven stationary measurement points were established in the radius of 100 km around Chernobyl (Vasilevich, Bragin, Babchin, Konotop, Mozyr, Majdan and Khoinik). They send the information to the Local Measurement Centre in Mozyr and afterwards to the Regional Response Centre in Gomel and finally to the National Response Centre in Minsk. Automatic system of radiation control is connected with system of early warning for emergency situations.

Outstanding values in the automatic system during 2012 and the beginning 2013 were not detected.

Monitoring of soil

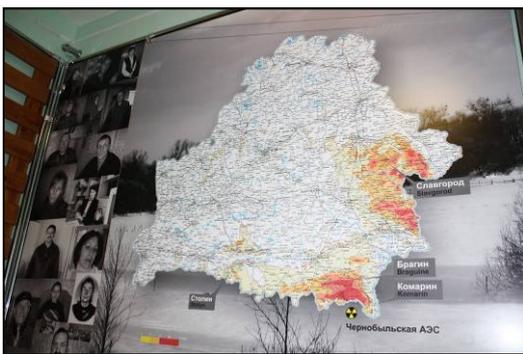
Not only the level of contamination is important, but the rate of migration of radionuclides in different types of soil as well. It is interesting because it determines the way of how to use the land in specific conditions.

Monitoring of water

Water in rivers River Pripjat and Nizna Braginka in the 30 km vicinity of NPP Chernobyl on the border with Ukraina have always elevated levels of contamination that is caused by elution from soil on their banks.

Level of contamination in the regions is on decrease. In this process monitoring of the environment plays an important role. It is focused not only on cesium but strontium and plutonium as well.

Consequences of Chernobyl accident in Belarus and countermeasures in agriculture



Evacuation of 24 700 people from 30 km zone till August 1986 and 110 000 people in the next years was executed. More than 70 villages in Belarus were evacuated – in the regions Bragin and Slavgorod.

Liquidation of cattle in evacuated regions was executed.

265 000 hectares were excluded from agricultural use because of contamination.

682 000 hectares was covered by deep ploughing.

Radiological inspection of food and soil was conducted. The first map of contaminated sites was available in June 1986,

the detailed map in 1991.

Serious leak of experts, information, resources for protective measures in agriculture was manifested.

Effects of Chernobyl accident were so huge that the possibility to treat them turned up insufficient. Radiological limits for food were changed many times after accident.

If experiences from accident at company Majak and other accidents had been better used in accident management, consequences of Chernobyl accident would not have been so sever.

The current situation is different. Countermeasures in agriculture are evaluated by groups of experts, handbooks for agricultural use of contaminated areas are issued, the recommendations for selection of appropriate types of agricultural products are given. And whole process is under permanent control of laboratories. Since 2006 there is 99.9 % milk production under cesium limit < 50 Bq/l, 99.7 % of beef meat under cesium limit < 100 Bq/kg. But many problems have remained.

Consequences of Fukushima accident in Japan and countermeasures in agriculture

Situation after the accident at the NPP Fukushima was different. Experts in Japan have taken very well lessons from the nuclear accidents in the world, especially in Chernobyl. Results of these lessons were seen in the early phase after the accident. Evacuation at the vicinity of the nuclear power plants in Fukushima started six hours after the earthquake. Till the first explosion of hydrogen on the power plant more than 50 000 people were evacuated in the range of 10 km. Evacuation of all 78 000 inhabitants from the range of 20 km was completed in four days.

And the countermeasures in agriculture are more effective in comparison with the days after Chernobyl accident. Integrated policies for radioactivity in agriculture include: the measurements of radioactivity and mapping of farmland, the methods for reducing transfer to agricultural products. Only effectively combine techniques for reducing the transfer of radioactive substances to agricultural products with the results from product inspection and the mapping of radioactivity is the way how to supply people healthy food.

Conclusions

Humankind has paid too much for the lessons not taken from Chernobyl. But the cost will be even higher, if not taken the lesson from Fukushima.

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References

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