Radon in thermal waters and radon risk in chosen thermal water spas in V4 countries

V4 Standart Project No. 21320324

Final meeting

Bratislava, November 27. – 28. 2014

Meeting Minutes

The participants:

Karol Holý,
Monika Müllerová,
Iveta Smetanová and
Pavol Blahušiak from Slovakia.
Tibor Kovács,
Erika Nagy and
Amin Shahrokhi from Hungary.
Jadwiga Mazur,
Kryzsztof Kozak and
Dominik Grzadziel from Poland.
Matěj Neznal from the Czech Republic.

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Karol Holy greeted the participants.
The participants unanimously accepted the items of the agenda.

The participants from each of V4 countries (Faculty of Mathematics, Physics and Informatics, Department of Nuclear Physics and Biophysics, Comenius University, Slovakia; Social Organization for Radioecological Cleanliness, Hungary; Institute of Nuclear Physics PAN (IFJ PAN), Laboratory of Radiometric Expertise, Poland; RADON v.o.s., Czech Republic) presented a short summaries about their activities performed in the frame of the project of the radon monitoring and research in thermal waters and spas.

Radon activity in the air of all spas was measured using three types of the detectors: Raduet, Ramarn and RNPB.

Pavol Blahušiak, from the Faculty of Mathematics, Physics and Informatics, Department of Nuclear Physics and Biophysics, Comenius University, Slovakia explained the results of three periods of measurements in four Slovak thermal water spas. Because the ownerships of the spas are currently private, spa directors allowed the monitoring only if they remained anonymous. Radon in water sampled was measured using Lucas cell. One water source with radon activity concentration exceeding 200 Bq/l was found. Indoor radon concentration in three monitored places in spas was higher than 1000 Bq/m^3.

Amin Shahrokhi, from the Social Organization for Radioecological Cleanliness, Hungary showed the results of indoor radon concentration monitoring in three Hungarian spas: one thermal bath, one spa and one Rn therapy hospital, performed in different rooms (sparking bath, pools, cash desk). In all spas, with exceptions of Turkish spa in Eger, radon activity concentration in air was below 300 Bq/m^3.

Dominik Grzadziel, from the Institute of Nuclear Physics PAN (IFJ PAN), Laboratory of Radiometric Expertise, Poland presented the partial results of the air and water monitoring in three spas in Poland. Monitoring was performed in therapeutic spa (Rabka Zdrój) in a therapeutic thermal bath and nurse's room, in the recreational spas (Szaflary, Bukowina Tatrzańska) in a swimming pool, dressing room and lifeguard room. Water samples were collected both from the tap and pool and measured using a liquid scintillation method and AquaKIT method. Very low radon activity concentration in air was found in all monitored spas, less than 100 Bq/m^3, in water radon activity concentration was below 5 Bq/l.

Matěj Neznal from the RADON v.o.s., Czech Republic showed the results of radon monitoring in the bathhouse in Teplice. Monitoring was performed in 8 rooms situated on the groundfloor (pool, balneotherapy, offices). Because radon activity concentration in the air of a room where the pool was situated was 3000 Bq/m^3, the working staff was instructed to increase the ventilation in order to reduce radon concentration.

After presenting their results, the participants were discussing about the project outputs and about the comparison of the results obtained using three types of detectors for Rn monitoring in the air.

After the round table discussion, Monika Müllerová prepared the list of publications including the preliminary results of radon monitoring in spas and also informed about new paper's preparation.

List of published articles:

Neznal M., Blahušiak P., Grządziel D., Holý K., Kovács T., Kozak K., MazurJ., Müllerová M., Nagy E., Neznal M., Shahrokhi A.: *International intercomparison measurement of radon concentration in water.* 12th INTERNATIONAL WORKSHOP GARRM (on the GEOLOGICAL ASPECTS OF RADON RISK MAPPING), September 16th – 18th (19th), 2014, Prague, Czech Republic.

Karol Holý[1], Pavol Blahušiak[1], Dominik Grządziel[2], Tibor Kovács[3], Krzysztof Kozak[2], Jadwiga Mazur[2], Monika Műllerová[1], Erika Nagy[3], Martin Neznal[4], Matej Neznal[4], Amin Shahrokhi[3]: *Radon in thermal waters and radon risk in chosen thermal water spas in V4 countries – preliminary results.* XXXVI. Days of Radiation Protection. Poprad, 10.-14.11. 2014, Slovak Republic

R. Böhm[1], A. Sedlák[2] , K. Holý[1]: INTERACTION OF RADON AND SMOKING AMONG CZECH URANIUM MINERS USING MODEL OF A THRESHOLD ENERGY. XXXVI. Days of Radiation Protection. Poprad, 10.-14.11. 2014, Slovak Republic. (It will be published in „Bezpečnost jaderné energie –Safety of Nuclear Energy", SUJB Praha)

Karol Holý informed about the preparation of the project's final report. Because of the lowered budged only two meetings were realized. Two measurements protocols were prepared in the frame of the project. The first protocol was used in intercomparison measurement of radon in thermal water in spa in Teplice, prepared by Martin Neznal. The second protocol used for indoor radon monitoring in spas was prepared.

Monika Müllerová summarized the accounting of the project. All participants agreed with the accounting.

Conclusion

The results of indoor radon monitoring obtained using Ramarn, Raduet and NRPB detectors were in a good correlation. In several cases they were not in an agreement with the results obtained using RAMARN detector.

The harmonized measuring protocols for radon monitoring in thermal waters and in the air in spa was elaborated.

Three articles including the results of radon monitoring in spas were already published. All participants agreed with the accounting of the project's expenses.

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Amin Sharhoki suggested to publish the final report in the journal for project reports.

The participants discussed about the future plans for the cooperation in monitoring of radon and thoron activity concentration in the different types of environment (schools, kindergartens, mines, caves, municipal buildings) and possible topics of a new project were proposed.

Conclusions

All participants planned to continue with the cooperation in radon and thoron research activities. The plans for the future V4 project were suggested and discussed.