The Future of the Radon Program in the Czech Republic
The problems and challenges from the regulatory point of view

Karla Petrová[1]

The State Office for Nuclear Safety, Senovážné náměstí 9, Prague, the Czech Republic,

Abstract. Recently the radon program in the Czech Republic is running under the governmental resolution adopted in 1999 for 10 years. During the 2008 year a new national strategy for the further long term management of the radon issue should be proposed to the government. Taking into account the experience from the preceding years and particularly the effectiveness of the running radon program the proposal which is now in preparation is more focused to the prevention in new houses and to the more qualified, understandable information distribution within the population. The current initiatives of EU concerning the natural exposure regulation within the recast process of the European legislation related to the radiation protection are also reflected as far as possible at the moment. The principal points of the decision making process and the highlights of the proposal for a new national radon program in the Czech Republic are given in the paper.

KEYWORDS: radon program, natural exposures, radon index, mitigation, remediation

1. Introduction

The Radon program has a long tradition in the Czech Republic. In fact it has been launched, in certain form immediately after the 1989 year when very high levels of the indoor radon concentration found in some houses have been published. Until that moment this problem has not been addressed in the country officially. The residents of these houses have been moved into new houses and whole situation got a high publicity. The government approved the program with the strong goal to find another buildings with elevated radon concentrations. The certain amount of the state budget has been set aside for the search of these houses (public and private) and also for the radon counter-measures where necessary. The details of the history of the Czech Radon Program is very well described in [1]. The conditions for the state financial support have been successively modified and the program has been focused also to the radon prevention in new houses. The legislative framework was developed.

Recently the program contains the following parts – screening, prevention, public water supply control, public information, research and development. These activities are financially supported by the government (app. 5mil CZK/200ths EUR per year). Remediation could be supported under given conditions by the additional amount of money reserved in the state budged for this purpose (max 40 mil CZK/1,6 mil EUR). However annually there is only 30% used from this dedicated amount and mainly for the public water suppliers. Under each part of the program there are individual tasks guaranteed by participating ministries, state or regional offices. The state bodies involved are – Ministry of Agriculture, Ministry of Environment, Ministry of Industry and Trade, Ministry of Finance Ministry for Regional Development, the State Office for Nuclear Safety (SUJB). The duties and responsibilities are specified in the governmental resolution and there is no official coordinator established. However unofficially this role is taken by SUJB. More specific information about the recent radon program could be found in [2]. There is no Ministry of Health involved up to now however there is strong wish for the future to have it also on the board and the negotiations in this sense have already started.

2. Regulatory Issues and Concerns

From the regulatory point of view there are still several problems to figure out for achieving effective and reliable system of the indoor radon exposure control. The first and important precondition is the existence of the companies able to ensure the quality of measurements of the indoor radon as well as

[1] karla.petrova@sujb.cz

the determination of so called radon index of the soil [3] in accordance with the specified and officially approved methodology. In case when the radon index is estimated higher than low one (detailed specification is given in the legislation and it is also described in [3]) there is an obligation to adopt during a construction a radon prevention.
The companies are licensed by SUJB, they have approved documentation required by legislation and they are periodically a subject of an measurement inter comparison organized by SUJB. The problem is that such in advance announced control of measurement is almost always very well evaluated however the most important and relevant - in situ inspection - is very complicated to arrange. There is no duty of the company to report to SUJB where and when the measurement will be performed. From the strict legislative point of view there is also not solved the access of the inspector to the private estate (the owner is not a liable party in this situation).

The second and no less complicated problem of the system is the control of an effectiveness of the radon counter-measures used in a new house. As it was pointed out already there is a legislative requirement for the measurement of the radon index of a building site. Based on the result the radon counter-measures should be applied during the construction of the house. But in the recent time nobody controls their effectiveness regularly. Primarily this is a duty of the building administration however we can observe a several problems in the practice. First the building offices have a lot of different problems to solve and radon is not really a priority at the moment for them, second there could be a conflict with the private ownership as was already mentioned above, third the use of established reference levels 200Bq/m3 resp. 400Bq/m3 in practice is very difficult to explain mainly to the experts from another branches not speaking of amateurs. Different reference values for new buildings and old buildings are problematic to apply and to use in the real life. The results of the radon measurements could thus significantly and not always correctly influence a real estate market. There is already experience with the attempt to influence the price of the house by the radon concentration slightly elevated above the reference level. Than the control measurement organized by SUJB on the request of the owner was slightly lower under the reference level. Informed people know that this situation can happen easily depending on the conditions of the measurement. The standardized measurement is long term measurement under normal conditions of the life in the house. We cannot influence the behavior of the people in the case when there is any interest to influence the result of measurement.

So the crucial point - measurements in newly constructed buildings is always under discussion – the short term measurement before the use of the building could be misleading, if long term measurement during first year of the use is performed what to do when higher than reference level is estimated and who is thereafter responsible for further steps? The owner? The constructor? The designer? And who will control them and how? Of course the optimal and best solution is an involvement and cooperation of all interested parties however the real life is not so ideal. We have to go step by step and mainly initiate the public education, explain the consequences and to try to catch the interest of the people to this problem so they will themselves interested in the improvements. Some specific “Czech” aspects of the public perception of the risk from radon are discussed also in [3]. This approach is reflected also in the new proposal as it is described below.

3. The future of the Radon Program

3.1. Objectives

The principal question when we have started to prepare the proposal for the continuation of the national radon program was “What is really the objective of this program?” There was a round table discussion organized under the presence of all involved parties. It must be stated openly here that there was not a full consensus reached during the discussion. There are still two main different opinions – we want to reduce the individual risk to the acceptable level given by the reference levels or we want to decrease the collective dose to the “reasonable” level (what is reasonable level here? – the level determined by cost-benefit analysis within the optimization process?). It is clear that for significant decreasing of the collective dose we should go lower with radon concentration, quite below the reference levels established now by legislation - see also [4]. However the current position

of SUJB is to keep the reference levels which are now in compliance with new ICRP recommendations and also with the actual EU proposal. The main objectives of the national radon program will be the increase of the public education and awareness, the ensurance of high-quality measurements of radon concentration on the commercial basis, the appropriate legislative framework for the prevention of radon concentration in new houses, the necessary financial arrangements and the continuing research and development.

3.2. Public awareness

New proposal has as a first priority the increase of the public awareness on the radon by the all possible ways but not inducing the hysteria or unjustified fear. The idea followed is to provide the owners of old houses with all relevant information on the possibilities of the measurements, the meaning of the results, the possibilities of the remediation and on the all aspects of the governmental financial support if this will be still actual. The radon maps are published on the web side and accessible for all inhabitants – they can be used for the orientation where the radon problem could be really the problem and where the measurements are justified. The regional offices and municipalities will be also asked for the cooperation. There is also necessary to enforce the cooperation with designers, architects, relevant professional societies, universities. There is also an idea to organize from time to time an intensive information campaign within the country – including the help of media, organization of seminars, open public discussions, increase public education, etc…
Nevertheless here we enter also the psychological and social field where it is necessary to consult the strategy with experts to avoid the contra productive results. Especially in the countries where the democracy is still young the intervention of the state administration into the private life of people is always sensitive question and sometimes the enforcement could produce unexpected negative response.

3.3. Screening

Nowadays it seems that within the screening part of the radon program the searching of the houses with higher radon concentration would be difficult and ineffective. Of course not all houses with elevated radon concentration have been found however the attention was focused in last years of the program to the regions and villages where the elevated radon is indicated by the radon maps which were developed during the program and recently cover whole territory of the country. These maps could help to identify a radon prone areas in the country. It should be pointed out that in the frame of this screening part all schools, kindergartens and public water mains were measured and the remediation has been adopted where necessary and justified. There is a plan not to organize so massive official and state financed screening measurements as it was done in previous years. Owners of the houses can ask for the measurement in the future on the commercial basis and for this purpose will be necessary to ensure always some capacity of the qualified measurement.

3.4. Prevention

Similarly as for people living in old houses people going to build a new house will be provided with relevant information. The legislative requirement for the measurements of radon index of the building site before the start of building remains valid for all owners. The radon maps cannot be used for this purpose because based on the study initiated by SUJB there is no absolute correlation between the radon risk indicated on the maps and real measurement – there could be found spots with significant high radon concentration within the area identified as low risk area on the map. Geologists confirm this finding and they explain it by some extremities in the geological subsoil. Moreover we can understand this measurement also as an important part of the public awareness. So after the measurement owners will receive through the building offices the basic information about the results, what to do and how to implement the condition on the radon mitigation into the contract with the designer and constructor (there is already a technical code which covers also this aspect of the radon and which is binding by the legislation). They will be informed also about the possibility of the control measurement after the construction. Here could be also mentioned the idea discussed by the experts to apply the preventive radon counter measures automatically in all houses (it means in fact

better insulation). However this idea was refused for now because it was identified that the price of the measurement and the price of the better insulation (which could be really significant in the case of large buildings) is still significantly different for promoters.

3.5. Research and Development

The research and development was always an important part of the radon program and it will remain also for the future. The challenges are always in the area of radon measurement – improvements of radon diagnosis and proficiency, development of the standard protocol, better understanding of long-term indoor radon variation and of the influence of new building technologies and energy saving measures in new houses.
Another research area could be a remediation – mainly the long-term duration, cost effectiveness, feedback of availability- also standardization and proficiency must be improved.
Radon mapping is also an area where further development could be expected. The correlation between the maps and new measurements will be always interesting to evaluate. There is also under development so called radon index of the building (similarly as for soil – but this index will take into account specific parameters of individual building designs).
The investigation also should be focused further on to the estimation and analysis of the radon program impact and effectiveness. This should be done in the future also by independent evaluator to ensure unbiased and balanced view to the radon program as a whole and with all its aspects.

3.6. Financing

The financing of the organizational aspects of the radon program will be ensured by the individual ministries and offices within their budgets and it is proposed on the similar level as in the past program. The amount of money dedicated for the remediation is fully on the government decision. This decision will indicate also the level of priority which will be given by the government to the radon program. This is a good and clear example of the situation when the management and justification of certain radiation protection measures are not fully on the hands of radiation protection itself but it depends on the complex and actual situation in society.

4. Conclusions

The national radon program in the Czech Republic will continue in the future years in modified structure. Currently the new proposal for the governmental decision is under development. The future program will reflect the experience of the past years and will be modified mainly by the re-arrangement of the priorities. It will be focused notably to the prevention and to the public communication. The accessibility of the qualified and reliable measurements will be ensured by the government. The main goal is to reduce the level of the individual exposure to the acceptable level and to ensure as far as possible the compliance of the real radon concentration in the houses with established reference levels. The appropriate legislative, managerial and technical tools helping to achieve this goal will be further on developed or improved. The effectiveness of the whole program will be regularly performed including the independent assessment.

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REFERENCES

[1] Thomas, Josef, Fojtíková Ivana, Hůlka Jiří,, The Regulatory Role in the Czech Radon Programme
[2] Hůlka, Jiří, Radon in Context of Natural radiation Exposure: The Czech Experience, Radiation Protection Dosimetry (2008),
[3] Neznal Martin, Neznal Matěj, Human perception of Radon Risk and Radon Mitigation: Some Remarks, Radiation Protection Dosimetry (2008),
[4] Hůlka, Jiří, Radon Programme: Presence and Future, Radiation Protection Dosimetry (2008),