

RADIOLOGICAL MONITORING IN SLOVENIA

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Abstract: In the light of recommendations provided by ICRP, IAEA and other international bodies, an up to date monitoring programme should provide relevant data for a realistic quantitative assessment of radiation doses likely to be received by members of the public. Radiological monitoring programmes in Slovenia are explained and discussed.

INTRODUCTION

The form of a monitoring programme is determined by a number of factors: the type and amount of radionuclides likely to be found in the environment, the principle pathways of exposure, the way by which the environment is used by man and the characteristics of the population, its distribution, social activities, means of earning its livelihood, dietary habits and the origin of the food it consumes. Slovenian activities in this field are just one example of how these general issues are being resolved.

MONITORING PROGRAMMES IN SLOVENIA

The overall monitoring programme in Slovenia consists of three major parts:

- a general monitoring programme of the radioactivity in the country,
- three specific monitoring programmes in the surroundings of the Krško NPP, research reactor and Mine at Žirovski vrh,
- emergency monitoring programmes.

Basic programme structure is shown in Fig. 1.

The aim of National (general) Monitoring Programme is to control the external radiation and the specific concentrations of radionuclides in the environment and foodstuffs (Fig.2). It defines sampling locations, sampling and measurement frequency and list of interested radionuclides. Yearly assessment consists of dose assessment to the population, environmental contamination assessment and some projections. Unusual results in regular monitoring trigger supplementary monitoring programme which is in fact just an extended regular monitoring programme with an objective to clarify unusual results.

Specific monitoring programmes are performed in the surroundings of nuclear facilities. The most comprehensive one is the monitoring programme around the Krško NPP (Fig. 3). It consists of three sub-programmes:

Programme A -

- regular monitoring programme; it defines locations, methods and frequencies of monitoring of radioactive contamination of air, soil, rivers, precipitation and fallout, drinking water, human and animal feed;
- extended monitoring programme; it defines increased sampling rates and additional sampling locations; it is triggered by unusual results of programme A-1 to clarify the

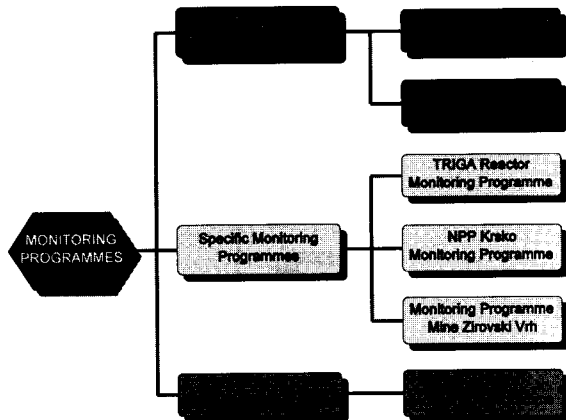


Figure 1. Monitoring programmes in Slovenia

problem;

Programme B - the programme of effluent and intercomparison measurements;

Programme C - the emergency preparedness programme of the Ecological Laboratory with a Mobile Unit (ELMU).

While *Programme A* represents regular monitoring programme *Programme B* defines sampling locations, representative samples and frequencies of sampling for control measurements of liquid and

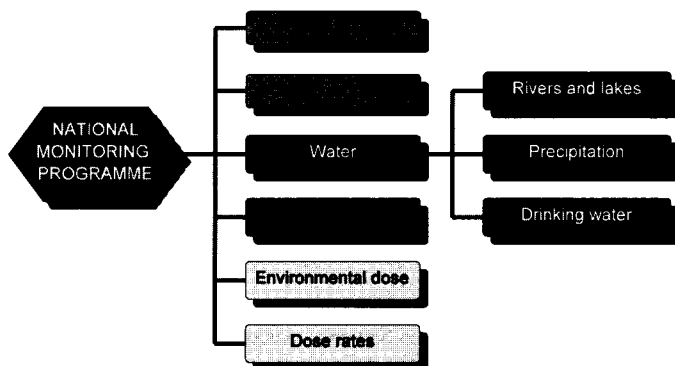


Figure 2. National monitoring programme

gaseous effluents and obvious intercomparison measurements. The aims of *Programme C* are intercomparison measurements between ELMU and Krško NPP, overall tests of emergency capabilities of ELMU, identification of any actual or potential weaknesses in equipment, procedures or team skills, team acquaintance with the surroundings of NPP, routes, measuring points and normal radiological parameters of the environment and finally improvements of the response plans, procedures and co-ordination. *Programme C* is for an adequate and efficient response in radiological emergencies of exceptional importance.

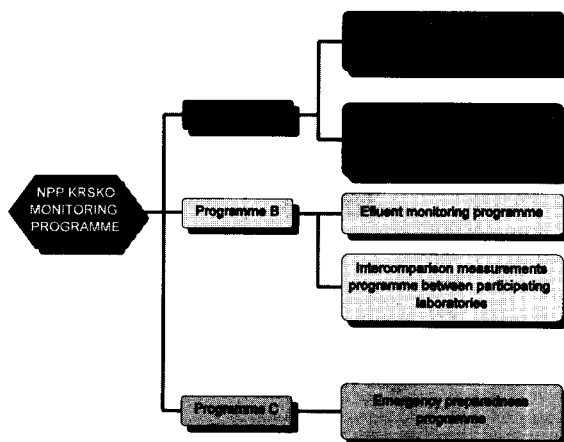


Figure 3. Structure of NPP Krško monitoring programme

Emergency monitoring (Fig. 4 and 5) consists of an early warning system and monitoring in EPZ. *Programme A* offers a sound basis for emergency monitoring. It supports a network of fixed measuring

points, a three circle network of TL dosimeters and a network of automatic meteorological stations with built-in gamma dose rate meters. The three basic networks are further supported by a network of accidental TL dosimeters, a network of fallout sample collection (vaseline plates) and a network of potential, predetermined measuring points.

Continuous monitors (MFM-202 of AMES Co.) with an automatically adjustable time constant supply data with a statistical uncertainty of $2\sigma = 5.4\%$. Thirteen such monitors around the NPP, which are on-line connected over MOBITEL to a central computer, together with 12 others installed at different meteorological stations distributed over Slovenia (so far operating autonomously) form the basis of an *early warning system* now under construction.

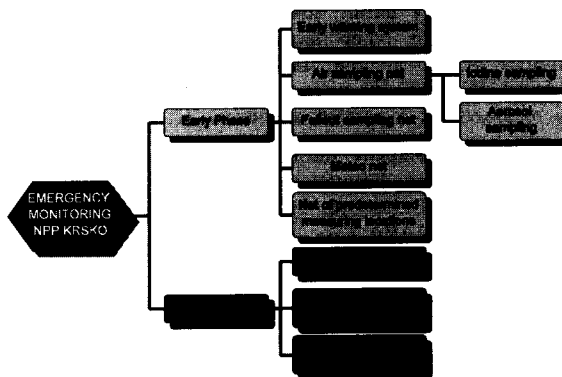


Figure 4. Off-site emergency monitoring programme structure

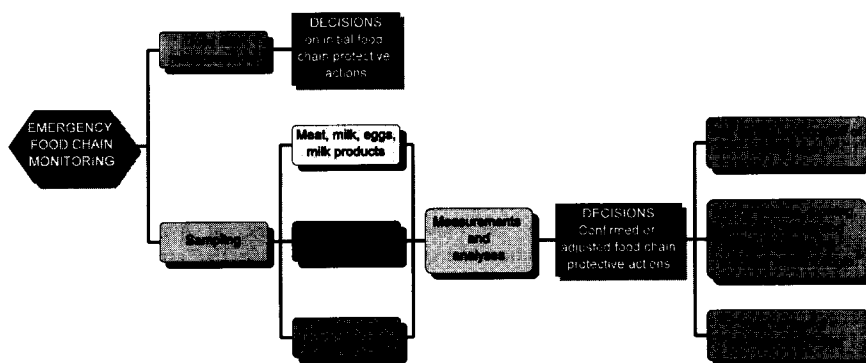


Figure 5. Emergency food chain monitoring

CONCLUSION

All monitored and quantitatively evaluated radiation burdens in the environment in the past 15 years have been in compliance with the licensed values, and well below the authorized limits specified by the competent authorities.

According to these data, the radiological impact on the environment of the Krško NPP for the last fourteen years of operation could be considered of minor significance and of a comparable order of magnitude to other radiological impacts in the Krško - Brežice region, caused by non-nuclear activities (paper - mill industry, hospitals, etc).