

THE PRE-OPERATIONAL MONITORING - HOW USEFUL ARE RECOMMENDATIONS OF INTERNATIONAL ORGANIZATIONS AND VARIOUS NATIONAL PROGRAMS

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NATIONAL LEGISLATION

Environmental monitoring around Nuclear Power Plant Krško was the first pre-operational monitoring to be performed in our country. The existing national legislation in the year 1974 included a basic law on radiation protection and accompanying regulations on radiation protection of workers, on registration of use, of production, transport and trade, as well as storage and release of radioactive materials, on monitoring the fall-out, food and animal feed, on education and health control of workers.

Six centers for radiation protection in six republics were responsible for monitoring and inspection. Some responsibilities were given to radiation protection laboratories in the existing three nuclear science institutes.

During the seventies the basic law with accompanying regulations was updated with some general requirements concerning siting, building and licensing nuclear installations, including some restrictions related to releases and storage of radioactive materials.

Until now no regulatory body for nuclear legislation with full time professionals was formed.

THE PRE-OPERATIONAL MONITORING PROGRAM DESIGN

The pre-operational environmental monitoring programs, in the period from 1974 to 1979 were based on recommendations of international organizations (1,2), the various national programs (3,4) and our own experience.

The general guidelines for the pre-operational radioactivity investigations necessary for estimating the dose from planned releases and for the establishment of limits and conditions of radioactive releases from an installation to the environment were given in Section IV, paragraph 405 of the reference (2). Yet in the above publication no suggestion was given on which samples are to be measured by specific and/or nonspecific methods, on the frequency of sampling, on the number of sampling sites etc. In paragraph 410 of the same publication it was stressed that the pre-operational investigations should provide quantitative data for the derivation of working limits and action levels for routine and emergency environmental monitoring.

National programs of pre-operational monitoring usually give detailed guidelines regarding the method of measurements for different samples and sampling frequencies. Yet all these programs are made for specific needs for each site.

The first pre-operational monitoring program for Nuclear Power Plant Krško was defined by the investor and the laboratories, which were doing the measurements, and approved by the sanitary inspectorate of the republic. The results were periodically reviewed and the program was improving until it was felt that the objectives were reached.

In the following, our first program will be described and the improvements which were made will be outlined.

RESULTS

Our first pre-operational program design included sampling and monitoring of surface and underground water, sediments and biota of Sava river, soil, agricultural products and natural radiation background. After the first review of results more emphasis was given to isotopic determination of water samples, biota and agricultural samples. Quality control was included in the program. After some time further modifications were introduced with the aim to identify the site specific critical exposure pathways. Modifications included the change and addition of sampling sites for underground water, river biota and agricultural produce as well as changes in frequency of sampling. Program of annual intercomparison measurements between the laboratories involved in the program and regular review of results was introduced.

DISCUSSION

Having in mind the main objectives of the pre-operational monitoring: to provide data on radioactivity levels in various environmental media and provide quantitative data for derivation of working levels and derived limits we have considered that quality assurance and the usefulness of information which the results provided should be the main criteria for a successful program. Examining the results of our five year long pre-operational monitoring program, we found that about one third of our results were unsatisfactory.

From our experience we learned that nonspecific measurements, unless they are made on the same samples as specific isotope determination, are of far less use than specific measurements. The results of specific measurements provide information which can be used for identification of critical exposure pathways, for determination of transfer parameters between compartments in an environmental model, and for establishing radioactivity levels in environmental samples in the pre-operational period. We realized also,

that critical examination of the relevance of program design as well as the examination of the quality of results is essential.

CONCLUSION

Lack of adequate national legislation and legislative body, as well as lack of authorized, experienced and competent radiation protection specialists resulted in our vaguely defined and poorly performed pre-operational monitoring in the year 1974-77. All improvements of the program were made by a concentrated effort of few competent radiation protection specialists from nuclear science institute laboratories.

We greatly emphasize the need for early education and training of radiation protection workers, as we cannot envisage a nuclear regulatory body, a supervising authority and a successful pre-operational and/or operational monitoring program without experienced specialists in radiation protection.

We feel, it may be useful that in their recommendations related to pre-operational monitoring the international bodies put more emphasis on site specific exposure pathways investigations, on the usefulness of specific activity determination of environmental samples as well as on regular critical examination and evaluation of results.

REFERENCES

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