

# THE ORGANIZATION OF ENVIRONMENTAL RADIOACTIVITY CONTROL IN ITALY

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## ABSTRACT

After the Chernobyl accident a great effort was made in Italy under the aegis of the Ministry of Health and the supervision of scientific institutions, mainly ENEA/DISP and Istituto Superiore di Sanità (National Institute of Health), to insure a wide coverage of the territory. This was accomplished to set up adequate environmental radioactivity monitoring networks covering the Italian territory as completely as possible.

This paper outlines the main features of the organization of the surveillance programmes. The role played by the scientific institutions and the Ministry of Health is underlined.

## INTRODUCTION

The control of environmental radioactivity is one of the main problems faced by the responsible bodies in Italy since the mid fifties. The approach used consisted to monitor both the sites around nuclear plants and the fall-out from nuclear weapon tests.

The methodology adopted for the surveillance consisted both in source (nuclear plants) and person related monitoring (fall-out). In the first case a preliminary study of the site, of the source characteristics and of the radionuclides discharged into the environment, identified the main environmental components, the food samples to be analyzed and the important radionuclides to be mapped. The doses received by critical groups were also evaluated by dedicated calculation programmes.

In case of fall-out, person related monitoring networks were set up where the main environmental samples - air

particulates, deposition, surface and marine waters - were analyzed as well as the typical components of the human diet (cereals, meat, milk, etc.). Hystorical series of these data are available for some samples beginning from the middle fifties (1).

#### CHERNOBYL ACCIDENT: A LESSON LEARNED

In Italy as elsewhere the Chernobyl accident, because of its peculiarity, was instrumental for testing the adequacy of the overall system set up to control environmental radioactivity. It appears from the beginning that for such type of accident it is necessary to have a real time system to measure air particulates in air. The already existing one, although the sampling points were distributed all over the country in places representative of the air mass circulation, was not adequate. The filters collected in each station were sent to a central institute to be processed causing considerable delay.

Standardized sampling procedures were not available causing some inconsistencies in the collected data: mainly deposition and soil contamination. Moreover, the distribution of sampling points was uneven and difficulties were encountered in obtaining samples from some parts of the country. Consequently, steps were taken to reorganize the environmental radioactivity control system. (2)

#### PRESENT STATUS OF ENVIRONMENTAL RADIOACTIVITY CONTROL POLICY IN ITALY

The policy adopted in Italy for the control of environmental radioactivity, has produced the new organization of the surveillance (3). According to Italian law the Ministry of Health, under whose responsibility falls the environmental radioactivity control, delegated this activity to the local Authorities. An environmental measurement laboratory is going to be set up in each Administrative District in order to assure a more complete coverage of the territory as new laboratories are added to the existing ones.

The tasks of these laboratories are the following:

- 1) control of the artificial radiation sources distributed over their territory;
- 2) detection of large scale radioactive contamination from inside or outside the territory ;

### 3) characterization of natural radiation sources.

Each laboratory shall be equipped with basic instrumentation for gamma-ray measurements; specific systems both passive and active are also envisioned to detect radon and radon daughter products. Laboratories were also selected where radiochemical analyses can be carried out to detect beta and alpha emitters.

The apparatuses were provided directly by the Ministry of Health after a national bid. A Commission appointed by the Ministry of Health has the task to coordinate and promote the environmental monitoring activities.

For the early warning system of radioactivity in air, to be set up in case of emergency, several actions have been undertaken during last few years by the ad hoc appointed body of Department of Civil Protection in conjunction with the Ministry of Health. First of all a high sensitivity automatic network to detect radioactivity in air in real time, will be located in representative sampling stations. At present stage, 5 sites have been chosen where the detection systems will be installed. The collected data will be transmitted to a central institute (ENEA/DISP in Rome), meeting point of a Committee in charge to evaluate radioactivity data in case of emergency (CEVAD). This first step will test the performance of the entire system in order to reach the optimal configuration.

A second automatic network to detect radioactive particulates in air in real time will also be located in places selected by the environmental radioactivity control laboratories. This network will integrate the early warning one so that, in case of emergency, a narrower grid will be established all over the territory.

Both the systems will be equipped with high resolution Ge detectors and will have a high sensitivity,  $10 - 100 \text{ mBq/m}^3$  on Cs-137 peak, according to sampling duration.

### RESULTS AND PERSPECTIVES

The organization of the environmental radioactivity measurement system existing in our country, requires a strict system of quality assurance and quality control. In this context, intercomparison exercises are organized on a two year basis among the various laboratories (typically in the number 20 to 30) to guarantee consistency and reproducibility of measurements. The intercomparison results will be presented

during this Conference. The importance of these programmes and the great efforts both technical and economical required to run such networks should be noted.

The funds allocated by the Ministry of Health during the period 1988-91 are of the order 16 Billion Italian lire (1.4 Million dollars) including apparatuses, general expenses, training, etc.

Special attention was paid to the training of personnel. In this context a good example was offered by the national survey on natural radiation indoors (4), where a close cooperation, including training, was established among the Central Institutes (ENEA/DISP and Istituto Superiore di Sanità) and the various laboratories at District level. Other specific environmental surveys are being planned for the future which will create the opportunity to exchange experiences and views.

The laboratories entrusted with the environmental control programme are sending the data of the measurements to the Ministry of Health. A real time network for the transmission of data is being planned. The network will connect each laboratory with the Ministry of Health, ENEA/DISP, the Istituto Superiore di Sanità and the National Institute for the prevention and safety in working places.

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