**Summary:** Special monitoring, organised by the Central Laboratory for Radiological Protection, commenced in Poland after the Chernobyl accident. It revealed heavy contamination of grassland at the end of April and beginning of May 1986. The radioactivity of milk reached 2,000 Bq/litre, but that of meat did not exceed 400 Bq/kg. Wild animals, particularly deer, became contaminated. The grazing of cattle was prohibited for a brief period. Organisation of the radiological monitoring network is outlined.

KEYWORDS: Cattle - Contamination - Environment - Food inspection - Meat - Milk - Poland - Public health - Radioactivity.

**THE RADIOLOGICAL SITUATION PRIOR TO THE CHERNOBYL ACCIDENT**

Ionising radiation from outer space and from naturally radioactive elements constitutes the so-called natural radioactive background from which the population of Poland receives an annual dose of whole-body radiation amounting to 1-2 mSv (100-200 mrem).

Man-made sources of radiation (reactors, isotope sources, X-ray apparatuses and equipment for gamma-therapy), as utilised in accordance with obligatory regulations in Poland, have not produced any danger for the population or the environment.

Radioactive contamination stayed at the same level for more than 15 years. Some fluctuations in the level of contamination of milk were noted, however, in the course of applying the most sensitive methods of measuring fallout after testing of nuclear weapons. The last such occasion was in 1980 after experiments with nuclear weapons in the People's Republic of China.

As far as the contamination of food is concerned, the most significant cases involve the radionuclides caesium-137 and strontium-90. The mean level of these radionuclides in milk amounted to about 0.5 and 0.1 Bq/l, respectively. The mean contamination with Cs-137 of some other food products amounted to: 0.5 Bq/kg for meat, 0.4 Bq/kg for fish, 0.6 Bq/kg for potatoes, 0.2 Bq/kg for cabbage, 1.3 Bq/kg for onion and 0.7 Bq/kg for grain.

**THE RADIOLOGICAL SITUATION AFTER THE CHERNOBYL ACCIDENT**

On the night of 28 April 1986, the Prime Minister of the Polish People's Republic brought into being a Committee for Evaluation of Nuclear Radiation and Prophylactic
Action under the directorship of the Deputy Prime Minister Zbigniew Szalajda. The main tasks of the Committee were:

- the analysis of the data concerning radioactive contamination in the country and the evaluation of possible health hazards;
- the preparation of recommendations for the population;
- the coordination of actions of particular departments.

On 29 April 1986, the Central Laboratory of Radiological Protection activated the whole Service of Measurements of Radioactive Contamination to carry out the measurements in accordance with the alarm programmes. Sixteen Veterinary Hygiene stations also began systematic monitoring of the contamination of milk, meat, fish, grass and other products applying the method of total beta activity. Some laboratories also began measuring the activity of selected radionuclides.

The highest dose rates of gamma radiation measured 1 m over the ground were observed from 29 April to 3 May 1986. The maximum dose rate amounted to 0.6 mR/h. The dose rate subsequently decreased, reaching a mean value of about 0.025 mR/h on 10 May and continuing to decrease thereafter.

The contamination of grass was recorded as of 29 April, with a maximum value of 105,000 Bq/kg on 30 April. A decrease followed with some rise again on 14 May.

The contamination of milk was already detected on 29 April, and the maximum was observed the same day in the region of Lublin. It amounted to 2,000 Bq/l. After a decrease, a new peak was noted on 4 May amounting to 1,640 Bq/l. Then there was a decrease of contamination, with the level dropping to 200 Bq/l on 20 May 1986.

Radioactive contamination of meat in most cases did not exceed 400 Bq/kg.

Relatively low levels of radioactive contamination (mostly below 100 Bq/kg) were found in samples of meat products, fish and eggs.

The contamination was much higher in the case of meat of wild animals, especially roe-deer.

In the meat of these animals obtained in northwestern Poland, the region of highest contamination, the values reached about 1,500 Bq/kg during the period of May-June 1986. Since then, a systematic decrease in the level of contamination of venison has been observed.

On 29 April 1986, the Ministry of Agriculture, Forestry and Food Economy delivered an injunction against the pasturing of cattle and the use of green forages for feed in thirteen provinces. On 5 May this was revoked for all animals except dairy cows and cows prior to calving. On 13 May the ban was lifted for dairy cows.

After receiving the opinion of experts in different fields, the governmental Committee accepted the following limits of radioactive contamination for food products of animal origin:

- milk: 1,000 Bq/l
- meat, poultry and fish: 1,000 Bq/kg.

At the same time it was recommended that milk showing higher activity than the accepted limits should be processed into stable dairy products.

For young children as well as for pregnant and nursing women, it was recommended to use only milk powder from government reserves or import. A
regulation providing milk powder for children up to three years of age was also introduced.

In order to examine the radioactivity of Polish goods for the export market, control measuring stations were organised at seven border crossings.

Because a number of countries, especially those belonging to the Common Market, introduced restrictions on the import of food products from Poland, direct contacts were established with Veterinary Services from all the countries importing livestock, meat and food products of animal origin in order to agree on acceptable levels of contamination. This was achieved after the USA and Common Market countries set acceptable levels of contamination of imported food products in May 1986. These levels were adopted for exporting products of animal origin from Poland.

REGULAR CONTROL OF RADIOACTIVE CONTAMINATION OF THE ENVIRONMENT AND FOOD IN POLAND

Radiological protection in Poland falls under the general control of the State Atomic Agency in cooperation with the Ministry of Health and Social Welfare and the Ministry of Environment Protection and Natural Resources.

On behalf of the State Atomic Agency, the direct control of radioactive contamination of the environment is carried out by the Central Laboratory of Radiological Protection which performs duties of the Central Station of Measurements of Radioactive Contamination, coordinates the work of the Service of Measurements of Radioactive Contamination (which was called into being by a Resolution of the Cabinet on 29 August 1964), and prepares and accepts programmes and unified methods of radiometric examination for all the stations of the Service of Measurements of Radioactive Contamination.

At present the Service of Measurements of Radioactive Contamination possesses 140 laboratories in scientific, control and production establishments which are under the authority of various departments, including:

- Ministry of Health and Social Welfare
- Ministry of Agriculture, Forestry and Food Economy
- Ministry of Environment Protection and Natural Resources
- Ministry of Science and Higher Education.

The measurement stations operating at present were founded mainly in 1964 as part of the following establishments:

- Centres for Investigation and Control of the Environment: 40 stations (measurement of total fallout, air, soil, surface waters and vegetation);
- Provincial Sanitary-Epidemiological Stations: 39 stations (measurement of fallout, air and food products, especially milk);
- Stations of Veterinary Hygiene: 16 stations (measurement of grass, animal feed, meat and other food products of animal origin);
- Chemical-Agricultural Stations: 14 stations (measurement of soil and agricultural produce);
— Enterprises for Sewage and Water Supply: 11 stations (measurement of drinking water and sewage);
— Stations of the Institute of Meteorology and Water Management: 9 stations (measurement of air, atmospheric precipitation and water);
— Other institutes, mainly conducting scientific research: 11 stations (specialist measurements of food products and other materials).

The experience acquired from the functioning of the Service of Measurements of Radioactive Contamination as well as from the situation arising after the Chernobyl accident points to the necessity of:
— increasing the number of stations, by opening new ones;
— improving the flow of information between stations, central laboratory and the relevant Ministries;
— increasing and modernising the equipment in the control stations;
— organising offices within the relevant departments to coordinate actions. These offices should be equipped with highly specialised equipment allowing quick detection, identification and measurement of activities of particular radionuclides in the environment, with particular attention to food products.

In accordance with Polish regulations, sanitary control of raw materials and food products is carried out by:
— Provincial Sanitary-Epidemiological Stations subordinated to the Secretary of State in the Ministry of Health and Social Welfare (vegetation, milk, condiments and food products for home market);
— Veterinary Sanitary Inspection subordinated to the Veterinary Department and the Secretary of State in the Ministry of Agriculture, Forestry and Food Economy (products of animal origin, processing controls, storage and export).

After the Chernobyl accident, the Veterinary Department of the Ministry of Agriculture, Forestry and Food Economy decided to organise its own laboratories for highly specialised radiometric measurements of raw materials and food products of animal origin at the Veterinary Institute at Pulawy and at certain designated Stations of Veterinary Hygiene (Warsaw, Katowice, Poznan and Gdansk).

In October 1986, plans were drawn up to modernise laboratories and equipment and to train highly specialised staff. These laboratories, together with monitoring stations of the Service of Measurements of Radioactive Contamination already existing at the Stations of Veterinary Hygiene, will carry out measurements of radioactive contamination of food products of animal origin for both the home market and export.

It is expected that normal work in these laboratories will start in June-July 1987.

At the same time, the Veterinary Department is improving contacts with Veterinary Services and Food Hygiene authorities in countries that trade with Poland, especially those that import animals, meat and other food products of animal origin from Poland. The aim of these contacts should be to agree upon acceptable levels of food contamination and controls in international trade.
POLOGNE. — M. Szulc et J. Szczawiński.

Résumé : Des mesures de contrôle spéciales ont été instituées en Pologne après l'accident de Tchernobyl, sous la responsabilité du Laboratoire central pour la Protection radiologique. Elles ont révélé une forte contamination des herbages à la fin d'avril et au début de mai 1986. Le niveau de radioactivité a atteint 2 000 Bq par litre dans le lait, mais n'a pas dépassé 400 Bq par kilo dans la viande. Des animaux sauvages, en particulier des cervidés, ont été contaminés. La mise au pâturage des bovins a été interdite pendant une courte période. Les auteurs décrivent l'organisation du réseau de surveillance radiologique.


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POLOGIA. — M. Szulc y J. Szczawiriski.

Resumen: Después del accidente de Chernobil, se implantaron medidas de control especiales en Polonia, bajo la responsabilidad del Laboratorio Central para la Protección Radiológica. Estas medidas revelaron una fuerte contaminación de los pastos entre fines de abril y principios de mayo de 1986. El nivel de radiactividad alcanzó 2 000 Bq por litro en la leche, pero no superó los 400 Bq por kilo en la carne. Algunos animales salvajes, especialmente los cérvidos, se habían contaminado y se prohibió el pastoreo de los bovinos durante un breve periodo. Los autores describen la organización de la red de vigilancia radiológica.