CONSEQUENCES IN GUATEMALA OF THE CHERNOBYL ACCIDENT

J.F. PEREZ SABINO, R.E. AYALA JIMENEZ
Direccion General de Energia Nuclear,
Guatemala City, Guatemala

XA9745824

Because of the long distance between Guatemala and Chernobyl, the country did not undergo direct consequences of radioactive contamination in the short term. However, the accident repercussions were evident in the medium and long-term, mainly in two sectors, the economic-political and the environmental sectors.

1) Economic-political consequences:

Guatemala is a developing country suffering an economical crisis since the early 80's, which has increased the pouverty levels. As consequence, several developed countries, mainly of the european comunity, have assisted to Guatemala donating foods like powder milk, canned meat and fish, cereals and others. The foods have been distributed in the most needed populations.

In 1986, when the Chernobyl accident happened, Guatemala had not any laboratory with capability for determining if the imported or donated foods were radioactively contaminated. Thus, several samples of food coming from Europe were sent to Chile and other countries, to be analyzed. Some samples turned out contaminated by cesium-137 and strontium-90 in low levels, mainly the powder milk and milky derivatives. The government confronted the dilemma of accept or reject the contaminated foods, in momments when the external aid would be of capital importance for the most needy people. Since Guatemala had not regulations concerning with permissible maximum concentrations of radionuclides in foods, the recommended by the european community were adopted.

On the other hand, after the accident, several countries decided to demand the certification of the levels of radioactive contaminants in products imported from Guatemala. That decision created the need for certificating such levels in exportation products like banana, coffe, sugar, cardamom and marine products. The products mentioned represent the larger part of the country currency incomes.

To face up the two problems mentioned above, the government determined the establishment of a laboratory with analytical capability to quantify radioactive contamination levels in food and environment and, to assess the government in the taking of decisions regarding similar events that may occur in the future and that could have direct consequences over the country. In this way,

the Nuclear Analytical Laboratory was created within the framework of a Technical Cooperation Project with the IAEA in 1988, wich included also, the training of personnel to carry out the tasks of analytical chemistry and detection methods.

Thus, have been performed studies on imported products like powder milk, the which has showed cesium-137 in levels non nocives for the consumer (1).

Also, it has been determined that the cardamom absorbs cesium-137. The cardamom seed generates currency incomes plus than US $ 60 million yearly as exportation product (2), and shows cesium-137 levels among 2 and 8 Bq/Kg as mean. The seed is exported mainly to the arabian countries, due to its aromatic oil.

2) Environmental Consequences:

In 1990 began the government project "Radioactive and Environmental Contamination", in which framework were determined the levels of environmental radioactivity background in soils and grass of 20 provinces of Guatemala, mainly in agricultural regions. Concentrations of cesium-137 were determined among 1 and 8 Bq/Kg, in soil (3). The fraction corresponding to the Chernobyl accident was not determined because of the lack of data before the event. The levels of total and residual beta activities were also determined in the same samples, which work included the modification of a conventional method for calculating the curve of sample autoabsorption (4). The highest contamination concentrations were located in the northern zone of the country, where also the rain precipitation is higher than the other zones and where the cardamom is cultivated.

It was performed a study about the utility of the native mushrooms of the central region of the country, as bioindicators of contamination by cesium-137. Levels among 2.2 and 9.0 Bq/Kg were found in the mushrooms and levels from 1.9 to 2.7 Bq/Kg in the soils where the mushrooms grow (5).

The most important conclussions derivated from the studies before mentioned, are that the guatemalan environment has been affected by nuclear tests performed during the present century and by the Chernobyl accident. The distribution of the radioactive contamination is nearly to be uniform in the whole country, showing little variations, especially the northern regions where are found the higher levels. The found levels are useful as reference levels for future studies and for controling the environmental radioactivity background, which make easy the determination of the impact of environment contaminant events that could take place in the future.

The information is useful for the central american region, because of its geographic uniformity and its territorial extension that makes the climatic characteristics be similar. The importance is high, since the other central american countries have not local information about levels of environmental radioactive contamination.

The second study about environmental radioactivity in the whole country was started in 1994, and it shows the changes in the concentration of the radionuclides of importance and the modifications in the quantitative methodology. Also, this study includes the determination of alpha and beta-emitter radionuclides of environmental importance.

This year started the project "Radioactivity and contamination of the marine environment", which is a technical cooperation project with the IAEA. This project contemplates the determination of radionuclides and metals concentrations in sediments, water, bioindicators and marine products in the seas of Guatemala. The results are of high importance since Guatemala has coasts in the Atlantic and Pacific oceans, while the central american regions presents lack of information about marine radioactivity. The information will allow the comparation between the two environments and will contribute to define the strategies in marine environment matter.

In consequence, the Chernobyl accident has signified for Guatemala, the starting point for a) the preparation for facing up possible future events that may contaminate the guatemalan foods and the environment. b) taking decisions regarding international trade and the population health, especially when in the future is foreseen the proliferation of nuclear power plants, like the two existing since 1991 in Mexico, country next to Guatemala.

1) Pérez, J.F.; Sánchez, J.M. CESIO-137 EN LECHE EN POLVO DE CONSUMO EN GUATEMALA. Guatemala:DGEN. Doc. Tec. 1994.

2) Revista Crónica. 1995 GUATEMALA EN NUMEROS. LOS DATOS CLAVE DE LA ECONOMIA, LA SOCIEDAD Y LAS FINANZAS. Guatemala:Anahté S.A., 1995. p. 37.

3) Ayala, R.E.; Pérez, J.F. CESIO-137 EN SUELOS Y PLANTAS DE GUATEMALA. Ciencia y Tecnología Nuclear. Vol 1. No. 1. junio 1993-junio 1994. p. 48-51.

4) Pérez, J.F. ACTIVIDAD BETA EN SUELOS Y PLANTAS DE DIFERENTES REGIONES AGRICOLAS DE GUATEMALA. Tesis ad gradum. Universidad de San Carlos de Guatemala. 1993. p. 19-33.

5) Pérez J.F.; Loaiza, E.S. HONGOS COMO MONITORES BIOLOGICOS DE CONTAMINACION POR CESIO-137 EN EL AMBIENTE GUATEMALTECO. Ciencia y Tecnología Nuclear. junio 1994-junio 1995. En preparación.