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CHERNOBYL: THE FEAR OF THE UNKNOWN

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For twenty years the drama of the Chernobyl accident at the end of April 1986 has persisted. Vivid worldwide in the memory of the public, even now it affects millions in Belarus, Russia and Ukraine.

On the night of 25-26 April 1986, an enormous quantity of radioactive dust was released into the air from the melting reactor core of the badly-built and poorly-maintained Soviet reactor at Chernobyl, in the Ukraine. It put out as much radioactivity as 0.5% of all previous 543 nuclear explosions in the atmosphere. The Chernobyl dust covered all Europe and Northern Hemisphere. It penetrated up into the lower stratosphere and fell even at the South Pole. Nothing worse could happen with a power reactor: a total meltdown of its core, and a ten days free release of radioactive material into the open air.

Surprisingly, however, the worst harm was caused not by radiation, and not to the flesh, but to the minds.

In terms of human losses (31 early deaths), the accident in the Chernobyl nuclear power plant was a minor event compared with many other man-made catastrophes. In 1984, about 15,000 died from the eruption of a fertilizer factory in Bhopal in India; the collapse of a Chinese dam on the Banqiao river in 1975 caused some 230,000 fatalities. Counted per electricity units produced, which is the only practical comparison, fatalities in Chernobyl were lower than from most other energy sources: three times lower than oil-fired power stations, 13 times lower than liquefied gas, and 15 times lower than hydroelectric stations. But the

political, economic, social and psychological impact of Chernobyl was enormous. Let us have a look at what happened, starting with my personal experience.

About 9 a.m. on Monday 28 April 1986 at the entrance to my institute in Warsaw I was greeted by a colleague saying: "Look, at 07:00h we received a telex from a monitoring station in northern Poland saying that the radioactivity of air there is 550,000 times higher than a day before. A similar increase I found in the air filter from the station in our backyard, and the pavement here is highly radioactive".

This was a terrible shock. It is curious that all my attention was concentrated on this enormous rise of "total beta activity" used to detect radioactivity, although I knew that the actual dose rate of external radiation penetrating our bodies was only three times higher than the day before and was similar to the average natural radiation dose which we all receive from the ground and cosmic radiation. This "Chernobyl" dose was more than 100 times lower than the natural radiation level in some other areas of the world, where no adverse health effects among inhabitants have ever been observed.

But in 1986 the impact of a dramatic increase in atmospheric radioactivity dominated the thinking of me and everybody else. This state of mind led to immediate consequences. First there were various hectic actions, such as ad hoc setting of different limits for radiation in food, water etc. These limits varied between countries by a factor of many thousands, reflecting the emotional state of decision-makers and political and mercenary factors. For example, Sweden allowed for 30 times more radioactivity in imported vegetables than in domestic ones and Israel allowed less radioactivity in food from Eastern than from Western Europe. The limit of cesium-137 concentration in vegetables imposed in the Philippines was 8,600 times lower than in the more pragmatic United Kingdom.

Most of these restrictions were meaningless from the point of view of human health but their costs were enormous. As an example, Norwegian authorities introduced a limit for cesium-137 concentration in reindeer meat and game that was about 200 times lower than the natural dose in some regions of Norway. The costs of this false protection climbed to over US\$51 million.

Other countries were no better. Professor Klaus Becker from the German Institute for Standards estimated recently that this kind of practice, together with its consequences for nuclear industry, meant that the costs of the Chernobyl accident in Western Europe probably exceed US\$100 billion.

The most nonsensical action, however, was the evacuation of 336,000 people from the contaminated regions of the former Soviet Union, where the radiation dose from Chernobyl fallout was about twice the natural dose. Later, the officially acceptable limit was set below the natural level and was five times lower than radiation at Grand Central Station in New York. "Contaminated regions" were defined, using a level of radioactive cesium-137 in the ground ten times lower than the level of natural radioactive matter in the soil. The evacuation caused great harm to the populations of Belarus, Russia and Ukraine. It led to mass psychosomatic disturbances, great economic losses and traumatic social consequences. According to Academician Leonid A. Ilyin, the leading Russian authority on radiation protection, the mass relocation was implemented by the Soviet government under the pressure of populists, ecologists and self-appointed "specialists", against the advice of the best Soviet scientists.

Besides the 28 fatalities among rescue workers and the employees of the power station due to extremely high doses of radiation, and three immediate deaths due to other reasons (the UN's Chernobyl Forum gives "less than 50" by adding in some later deaths from causes not related to radiation, such as lung tuberculosis, fat thrombosis, car accident, suicide etc. In fact, the mortality rate of survivors of the acute radiation sickness,

at 1.09%, was much lower than the mortality rates for the whole population of Belarus of 1.4%, Russia's 1.38%, and Ukraine's 1.65%), the only real adverse health consequence of the Chernobyl catastrophe among about five million people living in the contaminated regions is the epidemic of psychosomatic diseases. These diseases were not due to irradiation with Chernobyl fallout but were caused by "radiophobia", an irrational fear of radiation, aggravated by wrong administrative decisions. These decisions made several million people believe that they are "victims of Chernobyl", although the average dose they receive from Chernobyl radiation is only about one third of the average dose from Nature. This was the main factor behind the economic losses caused by the Chernobyl catastrophe, estimated to have reached US\$148 billion by 2000 for the Ukraine, and to reach US\$235 billion by 2016 for Belarus.

Psychological factors, and neglect of radiological protection in the curriculum of medical students, led to some 100,000 to 200,000 wanted pregnancies aborted soon after the accident in Western Europe, where physicians wrongly advised patients that Chernobyl radiation posed a health risk to unborn children.

In 2000 the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), the most authoritative body in these matters, and in 2006 also the UN Chernobyl Forum, stated that, except for thyroid cancers, in the highly contaminated areas no increase in the incidence of solid cancers and leukemia was observed.

As for the thyroid cancers, I believe that the increased discovery is due to a screening effect. In normal populations there is a very high incidence of "occult" thyroid cancers (with no clinical symptoms), which is up to 28% in Japan and 35% in Finland, and a hundred to a thousand times higher than the incidence of "Chernobyl" cancers. After the accident more than 90% of children in contaminated areas started to be tested for thyroid cancers every year. It is obvious that such vast screening resulted in finding the normally undetected occult cancers.

What is really surprising, however, is that data collected by UNSCEAR and the Forum show 15% to 30% fewer cancer deaths among the Chernobyl emergency workers and about 5% lower solid cancer incidence among the people in the Bryansk district (the most contaminated in Russia) in comparison with the general population. In most irradiated group of these people (mean dose of 40 mSv) the deficit of cancer incidence was 17%. Nor did the incidence of hereditary disorders increase. These epidemiological data should be used as a proper basis for realistic projection of the future health of millions of people officially labeled "victims of Chernobyl", rather than an assumption (LNT) on linear no-threshold relationship between irradiation and medical effect. This assumption tells that even near zero radiation dose can lead no cancer death and hereditary disorders. LNT assumption was used by Chernobyl Forum to estimate 4000 to 9336 future cancer deaths among people who received low radiation doses, lower than lifetime natural doses in many regions of the world. Greenpeace had less hesitations and in its report of April 2006 calculated six million cancer deaths due to Chernobyl event. Dr. Lauriston Taylor, the late president of the U.S. National Council on Radiological Protection and Measurements deemed such practice to be "a deeply immoral use of our scientific heritage".

UNSCEAR's sober conclusion is that the people living in "contaminated regions of Belarus, Russia and Ukraine "need not live in fear of serious health consequences", and forecasts that "generally positive prospects for the future health of most individuals should prevail." In centuries to come, the catastrophe will be remembered as a proof that nuclear power is a safe means of energy production.

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----- Original Message -----

From: Zbigniew Jaworowski

Sent: Tuesday, May 02, 2006 10:18 AM

Dear Friends,

IPN asked me to write an op-ed on Chernobyl, which they hoped to place in a few leading western journals. You may use it as you like.

Best wishes,

Zbigniew

MbrExchange mailing list (American Nuclear Society)