

Preface

A very strong earthquake (of magnitude 9.0) and huge Tsunami (more than 30 m high) hit the northeast coast of Japan's main island on March 11th, 2011 (3.11 disaster). It devastated many coastal cities, towns, and villages, wiping out the lives and livelihood of many people. It also hit a nuclear power plant: Fukushima Dai-ichi (#1) Nuclear Power Plant of Tokyo Electric Power Co (TEPCo). The quake damaged many parts of the plant, cut off the main electricity source, and also caused failure of the cooling systems, which are required to maintain the nuclear fuel rods at a low temperature. The bad situation was exacerbated by the devastating Tsunami, which destroyed the emergency electricity sources. This caused a number of incidents that released radioactive material produced in the nuclear fuel rods. The four reactors (units 1–4) were subjected to various kinds of explosions.

The explosion of the unit 3 reactor reminded us of the atomic bombs dropped on Hiroshima and Nagasaki in 1945. The extent of the explosion and the damage caused are not comparable, but there are a number of issues common to both of them. One of the issues is that they released enormous amounts of radioactive material. In other words, Japan has been hit by radioactive material (fallouts; sometimes called the “ash of death” in Japan) now three times: two due to the atomic bombs and now the accident at Fukushima nuclear power plant.

There was another incident in 1954; the fishermen on Dai-go (#5) Fukuryu-maru were exposed to the fallout produced by a hydrogen bomb test by the United States on Bikini Atoll in the middle of the Pacific Ocean on March 1st, 1954. It has been revealed recently that this incident was much larger in scope and much worse than what was publicly revealed at the time. More than 900 fishing vessels were exposed to the fallout, and they had to dispose of their catch. Two hundred and forty one fishermen were exposed to radiation, and 77 died by May 1988; 61 of those 77 died of cancers. On March 24th, another hydrogen bomb was exploded, and 19 of the fishermen on Dai-ni (#2) Kosei-maru were radiation-exposed and died in their 40s and 50s. The radiation on the boat was 48.5 mSv/h. (And many of the islanders are still suffering from the effects of radiation as well.) If this is included in the counting, Japan has now experienced four (not three) major incidences of radiation exposure.

The effect of radiation due to the Fukushima disaster is not confined to Japan, as was seen in the event of the Chernobyl nuclear power plant accident in 1986. There are currently over 440 nuclear power reactors operating on this planet, but some developing countries such as China and India are planning to build more in the future; they will definitely increase the dangers of radiation.

Radioactive materials have also been dispersed as a result of atomic bomb tests above ground as well as underground. At least 2,000 aboveground tests were conducted, and all the radioactive products associated with the atomic bomb explosions would have fallen all over the world. A least estimate of these fallouts from the tests is said to be equivalent to that of 40,000 Hiroshima bombs. In addition, the nuclear waste from nuclear power reactors was dumped into the ocean until an international ban came into effect in 1993. All of these human activities have spread an enormous amount of radioactive material in the environment in the last half a century or so, and have increased the level of background radiation. Some of the radioactive isotopes have disappeared since, but many of them are still present in the oceans and on land. This could be at least partially responsible for the dramatic increase of cancers in recent decades.

This treatise will deal with the following issues: (1) the overall picture of the nuclear industry (weapons and power reactors), (2) the scientific bases of nuclear reactions versus chemical reactions and the biohazards of radiation, (3) some relevant data obtained from the Hiroshima/Nagasaki atomic bombs, the Chernobyl and Fukushima incidents, and others, and (4) how the science about the radiation effects has been developed, manipulated, and suppressed throughout the history of the development of the nuclear industry.

One of the basic themes of this essay will be to show that “Life is Incompatible with High-Energy Radiations such as α , β , and γ ”. The second would be to point out the necessity of the independence of science from political and economic constraints for humans to obtain accurate scientific data so that the human race would gain enough wisdom to succeed in surviving this mire of radiation effects.

It must be noted at the outset that not many strictly scientific studies have been carried out on the low-level radiation effects on health, because of the difficulties in obtaining accurate enough data and, also, the nature of the effects, which are essentially stochastic. Causality can be demonstrated only through epidemiological studies, which require large sample cohorts and proper control groups. Neither of these is easy to obtain or are often impossible in the case of low-level radiation effects. Therefore, no strict causality has been well established except for a few cases, and what we have gained so far are mostly correlations between health effects and radiation. Correlation does not necessarily prove causality, unless all other possible correlation factors can be proven wrong. Particularly difficult is the nature of the health effects, as the causes for diseases are known to be multiple and complicated.

Another difficulty needs to be pointed out here. Not many studies have been published in “proper” scientific journals, not because studies have not been conducted, but often because studies of controversial ideas/results have been denied publication. Therefore, much relevant information may need to be cited from rather

uncommon and obscure sources, including internet sites. The accuracy of the information given in these sources is often not strictly verifiable, and, hence, we should be cautious of the information thus obtained.

Besides, many important original literatures regarding the most serious issues, i.e., Chernobyl, were published in Russian, which this writer has neither access to nor the ability to understand. He has to rely on English translations or literature written in English about those source materials written in Russian.

The author gratefully acknowledges the useful comments and suggestions on several portions of the manuscript made by Dr. Leonard Angel, Emeritus Professor of Philosophy, Douglas College, Vancouver, Canada. It must be pointed out, though, that the author alone is responsible for all the ideas and interpretations of data expressed in this book, and any mistakes within it.

It might be suggested that readers who are not familiar with or not interested in the scientific aspects of the issues may skip Part I through Part IV.



<http://www.springer.com/978-3-642-38726-5>

Hiroshima to Fukushima

Biohazards of Radiation

Ochiai, E.

2014, XVI, 225 p. 90 illus., 46 illus. in color., Hardcover

ISBN: 978-3-642-38726-5