Atomic Bombing and Nuclear Energy Development in Japan

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Wish for Peace under a Mushroom-Shaped Cloud

The book entitled "Children of Hiroshima" which was published six years after atomic bombing in Hiroshima, was a compilation of the notes written by boys and girls of four to twelve years old at the time of bombing. This book was a best-seller at the time, and its translated version was published in thirteen countries. The editor/author of this book was Dr. Arata Osada (1887 - 1961), a world authority of Pestalozzi study. He was also a specialist in education, serving for eleven years as the first President of the Japan Education Society set up after the War. Besides, he was famous as a peace movement activist centering on Hiroshima bombing. Dr. Osada concluded the preface to the book, by stating "If a new form of energy, i.e. nuclear energy, which is so powerful as to destroy mankind, can be used for peaceful purposes, we can expect a further progress of human culture. In addition, he declared that promotion of sheerly peaceful utilization of nuclear energy is the sublime "right as well as obligation" imposed to the Japanese people. Obviously, each of 105 children wrote pathetic stories scrupulously about their painful experience of bombing and the subsequent tragic situation. These stories are so impressive that we cannot read through them without tears even today. One of the remarkable things about the notes is that nearly 10% of children expressed their grievous wish that the sacrificed lives of their blood relatives and friends should at least make some contribution to the future, saying, "I wish that this powerful energy should never be used for murder or war, but for peace and industry". (No one expressed any opposition to peaceful use of nuclear energy.) Thus, peaceful use of nuclear energy held its solid position in the dream of the Japanese people, who were suffering

from the nightmarish ravages caused by militarism, amid debris and poverty and without enough food to eat. The opinion, "Japanese people are allergic to radiation and feel repelled by any form of nuclear energy" is only a superficial view.

Start of Nuclear Energy Development Filled with Excitement

Between 1952 and 1955, a historical controversy arose over whether Japan should start peaceful utilization and development of nuclear energy, literally throughout the whole nation, among academic societies, the industrial sector, political circles, and the mass media. The dispute centered on the possibility that Japan might be involved in the nuclear weapons race of industrialized nations, including the United States which had advocated "Atoms for Peace." The focal point was how to stick to only peaceful uses, because nuclear energy was after all a "double-edged sword." (In those days, nobody expressed any concerns over the safety of nuclear power.)

As a result, the Atomic Energy Basic Law was unanimously adopted in the Diet on December 31, 1955, providing so-called "three principles" of independence, democracy and openness, as the essential conditions for holding fast to peaceful uses of nuclear energy. Then, the Atomic Energy Commission was inaugurated in January 1956 to assure and supervise the enforcement of the law (as a consultative body which was independent of administrative offices and "whose opinion must be fully respected by the Prime Minister"). "Independence" means not to be affected by foreign countries in terms of the military use of nuclear energy. "Democracy" means that anyone can participate in peaceful uses of nuclear energy according to his or her ability, in consideration of the trend of "red-purge" at the time. "Openness" means that nuclear energy development should be "transparent" so that all Japanese people can always make sure of the peaceful-use principle. (It was in 1978, nearly twenty years after the enactment, that the phrase "placing emphasis on safety" was added to the Basic Law.) What was still more noteworthy is a sentence in the preface, "The results of

development (achieved in Japan) shall contribute to international cooperation." This idea was based on a tragic but brave resolution that Japan wanted to contribute to the whole mankind through its achievements, since peaceful use of nuclear energy would be launched at the cost of lives lost in Hiroshima and Nagasaki.

To tell the truth, I myself was rather skeptical in those days about a hasty start of nuclear energy development with the international nuclear weapons race in progress (I was born in Hiroshima in 1926). As the electric power industry and the industrial organizations, such as the Federation of Economic Organizations, continued to advocate that "Japan should start peaceful use of nuclear energy as soon as possible," I once went to make a protest to one of those organizations, as a secretary of a voluntary study group of young scientists. The main point of the protest was a simple one, "It is outrageous to seek profit using nuclear energy without much thought in this country which suffered from atomic bombing". Mr. Seinosuke Hashimoto and others who received me expressed their sincere feelings, saying, "We deeply regret that we could not prevent Japan from being devastated because we were unable to stop the wild behavior of the military, and we are really sorry for the people. If nuclear energy were to contribute to the peace and reconstruction of Japan, we wish to serve as best as we can. I want you young people to help prepare the conditions necessary for nuclear energy development, instead of just opposing to it, and to participate in the development once it is launched. Mr. Hashimoto, who had served as a member of the House of Peers during the war, was already sixty years old then. He later became Secretary-General, and subsequently Senior Managing Director, of the only one private general consultative organization on nuclear energy development and utilization, "Japan Atomic Industrial Forum, Inc. (JAIF)," which was inaugurated three years after my visit (in 1956). Thus, he played an active part in promoting peaceful use of nuclear energy day and night for nearly twenty years. This man happened to be my predecessor.

There are too many cases to enumerate, in which the government officials, academic circles, and the people worked on this issue enthusiastically. The first was the selection of members of the Atomic Energy Commission. The Chairman went to Mr. Matsutaro Shoriki (Owner of Yomiuri Newspaper Publishing Company), who declined all the other major Cabinet ministerial posts to take this new post, whose rank was lower than that of other ministers. From academic circles, Dr. Hideki Yukawa, the only Nobel prize winner in Japan at the time, was persuaded to become a Commissioner. From the industrial sector, the first President of the Federation of Economic Organizations, Ichiro Ishikawa, gave up that post to serve as a full-time Commissioner. Furthermore, recommendation was sought from Socialist Party of Japan, which had always been bitterly opposed to the Government regarding of other policies. As a result, an economist and Professor of University of Tokyo, Hiromi Arisawa, participated in the Commission. (He later served as the Deputy Chairman of Atomic Energy Commission and from 1973 through 1988 Chairman of JAIF). Thus, the leading figures of the time stood as members of the Commission. The enthusiastic support for nuclear energy continued, partly because of the influences of Suez Disturbances. Later, all the nuclear related laws and ordinances and the necessary budgets were passed in the Diet by a unanimous vote of all the ruling and opposition parties, including the Communist Party, for more than ten years, resulting in the establishment of new research & development institutions.

Beginning of Trial and Error

Once nuclear energy development actually started, the developed nations, including the United States, the United Kingdom, France, and Canada, began to launch active advertisement toward Japan. As a result, it was recognized that Japan lagged substantially behind these countries in nuclear energy development. Opinions were openly expressed mainly by the conservative politicians and the industrial sector, to the effect that power reactors should be imported promptly. Actually, at the first meeting of the

Atomic Energy Commission held on January 4, 1956, Chairman Shoriki proposed a policy "to import power reactors as soon as possible". Dr. Yukawa, a reluctant Commissioner, was enraged at this proposal, and confided to a close friend that he wanted to resign, as early as the first day of the Commission meeting. My colleagues and I rushed to the hotel to persuade him to stay, and managed to smooth over the situation for the time being. Three years later, however, Dr. Yukawa resigned for reasons of "health", angered at the situation in which the original policy was not seriously observed. The policy, which was also necessary to eliminate military intervention, had aimed at steadily building up nuclear research & development, instead of choosing the easy way of depending on foreign countries.

The assertion that Japan should hastily import power reactors was based on the logic, "Several models of power reactors have already reached the stage of practical use in developed countries. The shorter way for Japan, which was a slow starter, would be to import promptly the power reactors 'at the stage of practical use' and tie up with foreign companies for technical cooperation to promote domestic production, while steadily building up research." The reactors considered to be at the practical-use stage were Britain's advanced Calder Hall reactors and the United States' light water reactors. The stage of practical use meant that power reactors would be able to compete economically with thermal power plants and there were no major concerns over safety. In line with this logic, lame explanation was repeated. After all, the conventional procedure of "technical transfer followed by domestic production," which all the Japanese industries had followed during the reconstruction period, was also applied to nuclear energy development. Behind this procedure was the fact that the electric power industry did not want the promising nuclear energy industry to be "managed by the Government". Such state management had annoyed the electric industry during the war. If the industry were to fully admit that nuclear power generation was still at the research stage, the Government-led development line might be established. A big political argument arose as to whether the first electric power

company to introduce reactors should be under government or private management. Finally, the general trend leaned toward private management, and a compromise was reached that Japan Atomic Power Co. (JAPC) would be established in 1957 as a private company "which would take charge of early-stage power reactors," with 20% of its stock owned by the Government. Such private line also began to be applied to the nuclear fuel industry as a whole from around 1970, and the Government ended up being in direct charge of only research & development, regulation on safety, safeguards, and carrying out and verifying the disposal of high level waste.

The documents which explained the safety and economics of nuclear power were rather questionable, because they ware largely influenced by the materials provided by the exporting countries, including the United States and the United Kingdom. At first, however, neither the general public nor the mass media expressed much concern. For example, even though a serious accident occurred at British Windscale Reactor in 1957, this accident was not brought up as a serious matter after an explanation was given that "it was not a commercial reactor, but a plutonium production reactor for military use." Instead, the biggest concern at the time of power reactor introduction was that Japan might be constrained by receiving technology and enriched uranium from nuclear weapons states. Therefore, the whole text of the bilateral Agreement for Cooperation with Britain was carried in newspapers, and a great deal of controversy was also aroused in the Diet. It was for the same reason that a British reactor using natural uranium was imported earlier than light water reactors. Research & development projects were promoted mainly by Japan Atomic Energy Research Institute (JAERI)and the Power Reactor and Nuclear Fuel Development Corporation (PNC) as well as universities, with the facilities such as reactors constructed one after another. For the past forty years, the nuclear related budget has grown continuously at a rate greater than the annual growth rate of the national budget. Since 1961, not a single year experienced any budget cutback. More than 400 billion yen is appropriated annually during the last several years for

nuclear research & development and about 480 billion yen for the current fiscal year.

Return to the Development by its Own Efforts

The basic national consensus on nuclear energy development was - and remains - elimination of the military use. With the changing situations, however, the explanations given to the public about safety and economics of nuclear power gradually betrayed themselves every time reports inconsistent with these explanations arrived from foreign countries, because such explanations had been just copied from the foreign vendors' documents without much thought. As for economics, the construction cost of nuclear power plants continued to soar because of the reason specific to Japan (aseismic design and construction) and the people's strong demand for the safety-first principle. In addition, because oil prices continued to plummet in 1960s, it was getting difficult for nuclear power plants to compete with rival thermal power plants in terms of generation cost. The situation at the time is well expressed by the term "moving target" which was prevalent in the United States. Regarding safety, an accident resulting in injury (death) occurred at SL-1 reactor (BWR experimental reactor), followed by the failure of ECCS (emergency core cooling system) operation experiment in the United States. As a result, the confidence in foreign materials and technology faded. Furthermore, even though no radiation was released to the environment, many defects were found in imported steam generators and major pipes, resulting in growing criticism for electric utilities' placing too much confidence in foreign vendors. In response to this, between 1970 and 1980, the Japanese Government and the people cooperated each other to establish new facilities and organizations to conduct engineering tests to check the safety of light water reactors (LWR), and efforts were made to improve the safety.

The accident at Three Mile Island Nuclear Power Plant (TMI) was also a great shock to Japan, with fundamental doubts generated about the safety of Japanese LWRs. Regarding this accident, it

was fortunate that the Nuclear Safety Commission had been newly established, separated from the pro-development Atomic Energy Commission, and started its operations. The Nuclear Safety Commission explained about the difference in design between TMI-type reactors and LWRs introduced to Japan, and about the extremely careful attitude toward operation in Japanese power plants. Thus, the Commission managed to persuade the general public and the mass media of the safety of Japanese reactors. The Safety Commission derived as many as 52 "lessons" learned from the analysis of TMI accident to further improve the design and operation of Japanese reactors. This also helped to recover confidence of the people.

Like foreign countries, Japan also felt great anxiety about the effects of radioactivity released by the TMI accident. Despite of the severity of the accident, however, the Japanese people seemed to have remained relatively composed compared with Westerners, because of the experience in Hiroshima and Nagasaki. Similarly, when the Chernobyl accident occurred, in addition to the fact that Japan is geographically far from the Chernobyl site, Japanese people did not swallow all the wrong reports about the radiation effects, including increased deformed animals and cancer cases, as compared with the people in Western Europe. This was why the public opinion did not lean toward the total abolition of nuclear power generation after the Chernobyl accident.

Meantime, the tendency to depend on foreign countries for practical use of technology could not be changed overnight. Nuclear fuel recycling has been the basic policy of the Atomic Energy Commission since the beginning of nuclear energy development. The average idea of nuclear industry, however, was that Japan should start practical use after making sure of the success in foreign countries, while proceeding with research. It would be an irony of history that this tendency was forced to change by the sudden change in U.S. plutonium utilization policy (around 1978 during the Carter Administration). It was external pressure, none other than "Carter Shock", that made the private sector realize that there was no other way but to promote nuclear

fuel and recycling technology by themselves.

Factors Governing National Attitude

Under such situations, the Japanese people's opinion about nuclear power generation is roughly as follows (the figures may slightly differ with the year and individual survey): 10% of the people support positive development, 50% think Japan should be prudent, considering safety, 20% are for the phase-out of nuclear power generation, and 10% think Japan should stop generation immediately. Surprisingly, the findings of our analysis indicate that unlike the traditional way of thinking, the necessity and the safety of nuclear power are not necessarily the biggest factors governing the national opinion. Rather, whether the people accept (or favor) nuclear energy or not was determined by the following three factors: the extent to which nuclear energy development reflects the people's opinion or behavior (it is called "efficacy" in social psychology), openness, and confirmation of no fear about military use. Incidentally, this viewpoint was emphasized in the new long-term program for development and utilization of nuclear energy formulated last fiscal year.

In Japan, open forums have been often held in recent years, under the co-sponsorship of pro-nuclear and anti-nuclear groups. The first of such forum was held in 1993 in Osaka by JAIF with the theme, "Whether or not plutonium should be utilized." This forum stuck to the principle of equality, with each party paying the same cost and with the same number of lecturers and auditors invited from both parties. The press conference was also held with both parties present. As many as 6,000 people applied for an admission ticket, and the lottery was held to determine one winner out of twenty applicants, with the representatives of both parties present. Regarding openness, the important thing is how to make the people "feel" openness. The related officials are in difficulties because of trade-offs between openness and physical security concerning plutonium and high level waste.

The issue of eliminating military use can no more be settled

as "the matter to be handled, not by the private industry, but by the Government." It was for this reason that in 1994 JAIF was successful in holding its Annual Conference in atomic-bombed Hiroshima. It is important that the general public understand that military use is not allowed in nuclear energy development of Japan, not only because it is prohibited by the Basic Law and the Diet resolution or because of IAEA inspection, but also because all the people in charge of nuclear energy development stand firmly against nuclear weapons "of their own will". Regarding this issue, the Declaration of JAIF Hiroshima Annual Conference reads as follows:

.....

1. We stand absolutely against nuclear weapons. ....Though the NPT will continue to serve as an important treaty to stem nuclear proliferation throughout the world, its unlimited extension is problematic without the eventual goal of abolishing nuclear weapons. As a country that has experienced atomic bombing, Japan must play the role, taking such opportunities as the 1995 NPT Review and Extension Conference, to make an appeal to the world of its issues.

2. ....the development of peaceful uses of nuclear energy is extremely significant, ...

3. ....Japan can appropriately play a considerable role in assisting the sound development of the peaceful uses of nuclear energy in the rest of Asia. ....

4. ....we pin much of our hope on the younger generation, and will strongly appeal for the necessity of improving science and technology education drastically.

5. ....We therefore make a strong appeal for the significance of preserving the Atomic Bomb Dome and other evidence as valuable assets for future generations in the world. ....

In this declaration, doubt was cast on unconditional and indefinite extension of NPT, and some officials of the Japanese Government expressed "feeling of discomfort" about this part. However, the undeniable fact is that it is problematic to extend NPT indefinitely without the prospect of ultimate abolition of nuclear weapons. This is why the NPT Review and Extension

Conference got into an imbroglio and had great pains to reach unanimous consensus for indefinite extension of the Treaty.

Another important thing in connection with nuclear weapons is that the data, which were totally extrapolated from the data gathered in Hiroshima and Nagasaki, were used to epidemiologically evaluate the radiation risk. If there is difference in occurrence by dozens of times between the cohort and the reference group, like in the case of contagious diseases or lung cancer caused by smoking, a casual relationship can be clearly proved. In an epidemiological method, however, it would be impossible to conclude that the source (in this case, radiation, especially low-level dose close to natural radiation) had "no effects." I am deeply grieved and wonder when the safety standard in the peaceful use will be properly established using the data and methods which are independent of hatred toward nuclear weapons.

Finding Their Own Way

Earlier, nuclear industry in Japan expected the advanced nations and the Japanese Government to make efforts or to defend them in many respects, but they now realize that there is no other way but to work on the issue entirely by themselves, and have begun to take such route. (Cooperation with the Government and foreign countries should be expected to some extent.) Some of these efforts may seem a quixotic deed to foreign countries. Since Japan is not essentially a nation of planned economy and the nuclear operators are private firms, some of the projects might be forced to modify, succumbing to their burden. Even in such a case, it is absolutely necessary to hold fast to the above-mentioned basic rules as a national consensus.