

# **A Critique of the radiation standards of ICRP, and the health risk assessments of severe accidents by WHO and UNSCEAR on Chernobyl and Fukushima**

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## **1. Introduction: The triple crimes and responsibilities of the Japanese government for the Fukushima Daiichi Power Plant Accident**

I would like to express my deep appreciation to the organizers of this international conference for the great work they have done in organizing the conference and also for giving me an opportunity to give a presentation here.

As an introduction of my presentation, I would like to emphasize that the issue of “health and environmental impacts of ionizing radiation”, which is caused by using nuclear energy or radioactive materials should be discussed from the point of view of social problems, politics and the economy. We should do this even before discussing the issue from the point of view of it’s being a problem of natural science. The extremely serious nuclear accident in Fukushima is actually a “man-made disaster” not a “natural disaster”.

We have been working hard for many years, together with many people in Japan and the world, to avoid repeating “Hiroshima and Nagasaki” as well as “Chernobyl”. In spite of all of our efforts and concerns, we could not stop such a serious disaster happening in Fukushima. We are feeling deep sorrow and regrets due to this disaster.

Immediately after the Fukushima accident, the Japanese government, TEPCO and the specialists who were supporting them started to repeat, “There is no clear evidence of health effects under the dose of 100 mSv”. They actually forced people in the affected areas to live under the much higher dose rate of radiation than before the accident.

After all, huge amount of radioactive materials were released from the four reactors and spread beyond the 30 km zone, which was defined as the zone for “temporary evacuation” or “sheltering”. Now, we all know that the extensive area is contaminated above the legal level of the “Controlled area”. In the normal operating situation at the plant, only the registered radiation workers could get permission to enter the “Controlled area”. However, because of the high population density in Japan, about 4 million (4,000,000) people have been living in the contaminated area. Around 150 thousand (150,000) people have been evacuated from the highly contaminated areas and are still living in temporary housing. Even now, after three years, the severe consequences of the accident remain unsolved and the radiation leaks etc. from and in the reactors have not been contained.

I think the Japanese government should be blamed for the triple crimes as follows.

- 1) They caused the severe accident leading to serious damage in Fukushima really as the result of the national policy to promote nuclear power plants.
- 2) They did not provide true or accurate information about radioactive contamination or its risk to the people after the Fukushima accident. The people in Fukushima might have been able to avoid additional radiation exposure if they could have had such information.
- 3) They have left the people in the affected area under the condition of insufficient support and protection from radiation contamination for the past three years.

The Japanese government has to take responsibility for these crimes.

The Japanese government is still continuing their policy of promoting the benefits of nuclear power plants without taking any responsibility for causing a serious disaster. Their policy could lead to another serious accident. We cannot accept such a policy. We have to protect the life and health of people as well as human rights. We have to protect environment from man-made radiation. We need to strengthen our international solidarity for that purpose.

## **2. The policies of the Japanese government since the Fukushima disaster is based on the ICRP recommendations regarding the emergency exposure situation.**

The International Commission on Radiological Protection (ICRP) gives an endorsement for the policies of the Japanese government and the nuclear industry.

The ICRP made a statement on Fukushima on March 21, 2011, just 10 days after the Fukushima accident.

They delivered the following three messages based on the ICRP 2007 recommendations: quote

1) The Commission continues to recommend optimization and the use of reference levels to ensure an adequate degree of protection with respect to exposure to ionizing radiation in emergency and existing exposure situations.

2) For the protection of the public during emergencies the Commission continues to recommend that national authorities set reference levels for the highest planned residual dose in the band of 20 to 100 mSv.

3) When the radiation source is under control contaminated areas may remain. Authorities will often implement all necessary protective measures to allow people to continue to live there rather than abandoning these areas. In this case the Commission continues to recommend choosing reference levels in the band of 1 to 20 mSv per year, with the long-term goal of reducing reference levels to 1 mSv per year.

end quote

As for the third message, it is not actually true in the case of Fukushima, as the reactors are not yet under control. However, the Japanese government is using this “reference level” saying that “we are now in the existing exposure situation in Fukushima.”

In Japan, the “ICRP 2007 Recommendations” are not yet officially introduced into the domestic laws for radiation protection. However, the government introduced the recommendations as “extralegal measures” after the Fukushima accident.

Together with the ICRP, IAEA, UNSCEAR and other international bodies, which were historically established to promote nuclear policy and protect the nuclear industry as well as the military, have been working systematically in Fukushima since the accident.

In the 2007 Recommendations, the ICRP categorized the radiation exposure into three situations, planned exposure, emergency exposure and existing exposure, and recommended radiation dose standards for each of these situations and also for occupationally exposed workers and the public.

After the Chernobyl accident, millions of people had to live in the contaminated areas while being exposed to long-term and chronic low doses of radiation. Then, ICRP made new recommendations for the emergency situation and for the long-term exposure situation after the accident.

In their new recommendations, the ICRP raised the doses of the dose level for intervention in the emergency situation drastically from the former levels, which was originally set after the Three Mile Island Accident in the U.S. So, the new recommended level, which they named the “reference level”, was made just for continuous promoting of the nuclear policy of the industry and of governments even forcing the danger of severe accidents like Fukushima onto the people.

Prof. Yamashita and other pro-nuclear specialists in Japan repeatedly speak out, saying, “No clear health problems under 100 mSv of radiation exposure”. Their view was actually supported by the international authority such as the ICRP. It was not only their personal “scientific” belief, rather, it was a political

message from the nuclear industry and the government.

As you already know, there are many evidences that low doses of radiation have harmful health effects on human populations, including A-bomb survivors, nuclear workers, the medical exposure of fetuses and so on. We also know that the health risk is not limited to cancer and leukemia. Risk of non-cancer disease such as circulatory disease is also significant even at low doses of radiation.

You can see on this slide, the policies of the Japanese government after the Fukushima accident, which were based on the ICRP Recommendations. Under these policies, the residents in the affected areas and the nuclear workers are forced to be exposed to further radiation.

- Standard for evacuation is 20mSv/year
- Early standard for cleaning-up the schoolyards was 20mSv/year. They reduced the standard to 1mSv/year later after facing to the strong objection from mothers.
- The tentative goal for cleaning up the contaminated areas is set to be 20mSv/year with the long-term goal of 1 mSv/year.
- The standard for returning the evacuated people from the highly contaminated is set to be 20 mSv/year
- In the text book published by the Ministry of Education, it is written that “There is no clear evidence of getting sick including cancer only because of ionizing radiation if the exposure dose is less than 100mSv at a time.” They are trying to educate children based on the ICRP recommendations.

As for the emergency workers at the Fukushima Daiichi Nuclear Power Plants, the government also decided upon the new dose limit for the emergency situation just after the accident, which met the reference level recommended by the ICRP. They raised the dose limit for the emergency workers from 100 mSv to 250 mSv.

I would like to emphasize that the nuclear workers who have to work in hazardous conditions at the Fukushima power plants are also the victims of the accident.

The nuclear workers are exposed to a much higher order of radiation in the emergency situation. Even now, many workers are exposed to doses more than ten times higher than those in the planned exposure situation in the normal operation of the plant. The working environment is quite different and much more dangerous from that at the plant before the accident, as the reactors are not yet under control.

It will take more than decades before reaching a complete control over the radiation problems and the decommissioning of the reactors. Many more, perhaps hundreds of thousands of workers will have to be involved in the process under the more dangerous situation of higher dose levels such as have existed since the accident.

Another serious problem is that most of the workers at the plant are working through sub-contractors. The sub-contractors are in a multi-layered structure, one that existed before the accident. Already more than 32,000 workers worked in the site and more than 27,000 of them are under the subcontractors. The workers of subcontractors are working under the worse condition, sometimes without proper control of radiation dose. They may have to quit working after being exposed to radiation up to the dose limit and leave without compensation. Often the owners of sub-contractors pocket kickbacks from the worker's salary. In most of the companies, workers cannot organize a worker's union to protect their rights. The government and TEPCO do not take responsibility for such a situation.

In addition, most of the workers are also residents in the contaminated area. So, they are exposed to radiation both in the working environment and at home.

Under such circumstances, it is very likely that skilled workers and engineers will not come to work at the

Fukushima plant.

### **3. The ICRP Recommendations are for the benefit of nuclear industry, but do not benefit or protect workers or residents from radiation exposure.**

After the establishment of the ICRP in 1946, the commission changed their views several times under certain historical condition. The commission has consisted of the “specialists” from the countries that promote nuclear policies.

In the 1977 ICRP Recommendations, the commission clearly established the “Trinity” system of radiation protection, which consists of three basic principles as follows:

1) Justification:

“Any decision that alters the radiation exposure situation should do more good than harm.”

*This really means that only the protective measures which produce “net benefit” can be “justified”.*

2) Optimization of protection:

“the likelihood of.... magnitude of their individual doses should all be kept as low as reasonably achievable, taking into account economic and societal factors.”

*This principle is called “ALARA”. This means to balance “cost and benefit” and manage to get the biggest benefit for the industry.*

3) Application of dose limits:

“Total dose to individual should not exceed the appropriate limits.”

*The limits are actually politically decided, though.*

*The ICRP recommends measurements and dose limits based on “Cost-benefit analysis” , but not based on true science.*

The ICRP Recommendations discussed other examples to evaluate the “value of people’s life” with money, including life-compensation court cases and fees for life insurance. Then they decided to create the converting rate.

You can see some examples here. In this equation, they calculated optimized protective measures in the design of a simple shield. They included a factor to convert the value of people’s life and health to money. They consider the value as \$ 10,000/ man • Sv.

This is another example of their optimization. They consider that the value of people is more than 10 times cheaper in “developing” countries than in “rich developed” countries. Thus they recommend the higher radiation standard for protective measure for developing countries.

You can understand from these examples that the ICRP decided upon recommendations actually based on politics and economy. They decide upon the dose level which will in effect protect the nuclear industry by forcing radiation exposure to people and workers.

In the 1977 recommendation, some other tricks are also introduced as following, including the introduction of the model of “Effective dose equivalent” which converts the internal organ dose.

At the time that the ICRP made the 1977 recommendations, independent scientists strongly disagreed with the recommendations. In Japan, the government introduced the 1977 recommendations eleven years later in 1988. We, in the anti-nuclear movement, which includes scientists, doctors and workers, organized a nationwide campaign to protest the introduction of the ICRP 1977 Recommendations at that time.

### **4. The latest data of the Life span study (LSS) of A-bomb survivors and the supporting policies for the A-bomb survivors should be considered to establish the supporting health and life policies for the people in Fukushima.**

I would like to emphasize the importance of using the data of the A-bomb survivors for demanding support

and compensation for the radiation victims.

The important key messages from the latest report on the Life span study (LSS) of the A-bomb survivors which was published in 2012, are the best-fit of the Linear-non threshold theory (LNT) and Dose and dose-rate factor (DDREF) is close to 1. This means that chronic and low-dose-rate of exposure can make the equal amount of risk of cancer death, if the total doses are the same between chronic exposure and acute exposure.

The ICRP uses DDREF of 2 for their calculations and underestimate the risk by half.

The Japanese government and pro-nuclear specialists do not want to take the implications of this report seriously.

In the ICRP 2007 Recommendation, they have conceded that LNT is “scientifically plausible” in the risk assessment of the incidence of cancer or heritable effects caused by radiation. However, they cannot decide upon the dose limit if they really decide to base it on the LNT. So, they actually decided to make the dose level based on the “cost-benefit analysis” to protect the benefit of the nuclear industry. This is a political decision.

## **5. The critical comments on the reports from WHO and UNSCEAR on Fukushima**

After the Fukushima accident, the WHO made two reports, one on the preliminary dose estimation in 2012 and the other on the health risk assessment in 2013.

The members of the committee, that made the “health risk assessment” report, are considered to be independent. However, some of them are also the members of the ICRP.

I would summarize my critical comments on the WHO health assessment report into the following seven points.

- 1) The health risk assessment is limited, in the first place, only to leukemia, female breast cancer and thyroid cancer.
- 2) They estimated increased lifetime risks of all solid cancer, leukemia, breast cancer and thyroid cancer over baseline rates in the highest dose location. For the people in the second most affected location, they estimated the risk to be about half. The figures should be critically discussed. However, I think it important that they conceded that there might be at least a certain increase of risk, which ICRP, UNSCEAR and different governments never conceded.
- 3) They seem to consider that “70% increase risk” of thyroid cancer is nothing.
- 4) They ignore the risk for residents in less contaminated areas by saying “the risks would be much lower than the normal temporal and spatial fluctuation of the baseline cancer incidence risks.”  
The Japanese government especially uses this part for their excuse to give no support to the residents in the contaminated areas outside of the Fukushima prefecture.
- 5) They support the Japanese government’s underestimation of radiation risk and endorse the inadequate health management policies in the affected area.
- 6) They suggest that the psychological factor is more important than the risk of radiation.
- 7) They reported that they tried to minimize the possibility of underestimation.  
At least, this point is appreciated in comparison to the UNSCEAR Report, which does not do this, although the Japanese government seems to dislike this point in the WHO report. They say that WHO is “conservative” in radiation risk assessment.

As for the UNSCEAR report, we can officially only get the short report, which was published in May 2013. The short report was submitted to the UN general assembly in October. We can also read the leaked materials of the discussion for drafting the report. The main report will be published officially this spring.

My critical comments for now are on the following six points.

1) They underestimate the health risk of low-dose of radiation.

They do not use the LNT in their risk assessment. They even made critical comments about the WHO's risk assessment in this regard.

They do not use the "collective dose" in the estimation of the health risk. This is another important point to criticize them.

2) They consider mainly the average dose of each population group.

3) They said increased risk of cancers would be expected among the highly exposed group of workers.

But, again they stated that the increase is "indiscernible".

4) They consider the most important health effect to be that of mental and social well-being rather than any radiation health effect. They mentioned that the fear about the risk of radiation makes people depressed.

5) They give endorsement to the inadequate health management and support to the affected people from the Japanese government.

6) They ignore the health risk of non-cancer disease.

Both the WHO and UNSCEAR say that the estimated health risk is within the "normal spatial fluctuation", "no discernible" or "indistinguishable from other cancers".

We have to note, "no discernible" or "indistinguishable risk", does not mean "no health effect from radiation exposure".

I would emphasize that it is important to estimate the health risk of both residents in the contaminated area and nuclear workers based on the LNT without using DDREF and by using the collective dose of the population. The UNSCEAR even criticize the WHO because they used the LNT and the collective dose in the risk estimation.

If we based risk assessments on the LNT without DDREF, by using the collective dose, we can estimate that at least 40 cancer death might be caused in the future among about 30,000 workers who worked at the Fukushima plant up to the end of last year. Though it is not easy to estimate the dose of residents and evacuees, we could roughly estimate that at least several hundreds or even more than 1,000 cancer deaths might occur among those 4 million residents in Fukushima and surrounding contaminated areas only from their exposure during the first year after the accident.

So, we can never let these cancer deaths, people's health and life, be ignored for the benefit of the nuclear industry. This risk would not exist without the Fukushima accident.

## **6. The Japanese government quotes the reports of WHO and UNSCEAR as the "international authorities" to use their views for the risk-communication on radiation with the public.**

In the leaflet for the risk-communication, they quoted the WHO report, saying, "the risks would be much lower than the normal fluctuation of cancer risk", and the UNSCEAR report "the risk for workers and residents will be indiscernible".

## **7. IAEA and other international bodies have been underestimating the radiation health impacts of the Chernobyl accident for the past 28 years.**

The radiation dose limit of 350mSv for the whole life was calculated and proposed by the government of the Soviet Union just after the Chernobyl accident based on the dose limit, 5mSv/ year, recommended by the ICRP at that time. The IAEA together with other UN agencies and governments made reports on the occasion of 5, 10, 15, 20 and 25-year anniversary of the Chernobyl accident. They formally conceded that only childhood thyroid cancer and leukemia of the clean-up workers are discernible health effects in Chernobyl. Such statements are disturbing the international humanitarian support for the Chernobyl victims.

It is important to criticize the underestimation of the radiation health effect by the international bodies in solidarity with those who are affected in Chernobyl and Fukushima in cooperation with the people from all over the world.

We have been doing various activities in Japan, together with the people from Fukushima and surrounding areas and in cooperation with the people from Hiroshima & Nagasaki and other areas nationwide, to protect children from radiation, to request the Japanese government to take responsibility for the accident and establish proper medical care and social support for people in the areas affected by the Fukushima accident. Unfortunately, it is not easy to change the policy of the government at this moment at once, but I believe we can or we have to move them to take their responsibility through our persistent effort.

We think it important to connect the campaign against nuclear power plants with the campaign to demand that the government give support and compensation to the affected people in Fukushima.

I think the issue is not only for Fukushima. It is a nationwide and international issue.

Let us strengthen our international solidarity towards the end of the “Nuclear era”. We are proposing to organize a concrete domestic and international action at the time of the 30<sup>th</sup> anniversary of Chernobyl and the 5<sup>th</sup> anniversary of Fukushima in 2016.

We wish to go forward together with you all, starting from Fukushima and Chernobyl to the “nuclear free future” in the world!

Thank you for your attention.