THRESHOLD ASSUMPTION IN A-BOMB AND NUCLEAR POWER PLANT LAWSUITS

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ПРЕДПОЛОЖЕНИЕ ПОРОГОВОЙ ДОЗЫ В СУДЕБНЫХ ДЕЛАХ ОТНОСИТЕЛЬНО АТОМНОЙ БОМБАРДИРОВКИ И АВАРИИ НА АТОМНОЙ ЭЛЕКТРОСТАНЦИИ

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This study aims to examine the possibility of calculating damages for the health effects of low-dose radiation exposure under an untraditional tort doctrine. This is because nuclear damage is a specific type of damage that has no precedent in Japan. In the A-Bomb «Black Rain» Lawsuit, the Hiroshima High Court extensively ruled that the health effects of internal radiation exposure were acceptable, without relying on scientific dose estimates. This is a different decision from the precedent in similar cases. This paper argues that the Hiroshima case is beneficial to the relief of the Hibakusha. However, the Hiroshima case did not deal with specific considerations of the threshold assumption and made a qualitative decision. And this had a negative impact on the Nagasaki judgement. In other words, the Nagasaki case led to an underestimation of the health effects of low-dose radiation exposure and, as a result, the scope of relief for Hibakusha was limited.

Keywords: 100 mSv Threshold Assumption, A-Bomb «Black Rain» Lawsuit, 5th Supplement to the Interim Guideline, Non-precedented Nuclear Damage

Целью данного исследования является изучение возможности расчета ущерба за последствия для здоровья от воздействия малых доз радиации в соответствии с нетрадиционной доктриной деликта. Это связано с тем, что «ядерный ущерб» является особым типом ущерба, не имеющим прецедента в Японии. В иске об атомной бомбардировке «Черный дождь» Высокий суд Хиросимы широко постановил, что последствия для здоровья от внутреннего облучения были приемлемыми, не полагаясь на научные оценки дозы. Это решение отличается от прецедента в аналогичных делах. В этой статье утверждается, что дело Хиросимы полезно для облегчения положения хибакуся. Однако дело Хиросимы не рассматривало конкретные соображения о пороговом предположении и приняло качественное решение. И это оказало негативное влияние на решение по делу о последствиях аварии на атомной электростанции Нагасаки. Другими словами, дело Нагасаки привело к недооценке последствий для здоровья от воздействия малых доз радиации, и, как следствие, объем помощи для лиц, получивших дозы облучения в результате аварии Нагасаки хибакуся был ограничен.

Ключевые слова: предположение о пороге в 100 мЗв, иск об атомной бомбардировке «Черный дождь», 5-е Дополнение к Временному руководству, беспрецедентный ядерный ущерб

1. Introduction

There have been two cases of widespread radiation contamination in Japan: A-Bombings of Hiroshima and Nagasaki in August 1945 («A-Bombings») and the accident at the Fukushima 1st Nuclear Power Plant of TEPCO, incorporated in March 2011 («Nuclear Accident»). In both cases, radioactive materials were released into the atmosphere by nuclear fission, and the spreading radioactive radiation caused both human suffering and property damage. However, while the A-Bomb is a nuclear weapon, the nuclear power plant is a power plant, and the purposes for which they are used are different. As a result, the amount of radiation released into the atmosphere after an A-Bomb explosion and the resulting damage to human health, are very different.

The Fukushima nuclear accident, along with the Chornobyl accident, is a level 7 «severe accident» on the International Nuclear Event Scale. The Japanese government announced that the Fukushima Daiichi nuclear power plant released radioactive material equivalent to about 10% of the level of the Chornobyl accident in the first month after the accident [1].

Of course, it is wrong to compare the A-Bombings and nuclear power plants only in terms of the same health effects caused by radiation. But even now, 80 years after the bombings, the Hibakusha are still fighting in court for compensation for their health effects. The fact that health effects remain after such a long period of time means that the effects of radiation exposure, especially low doses, on the human body are not clearly. From this point of view, it is difficult to make a final judgement, at least in court, on the health effects of the nuclear power plant accident that occurred 66 years after the A-Bombings.

I am interested in studying the possibility of health damage at doses of 100 mSv or less from an epidemiological approach. If it is determined that it is not scientifically reasonable to set a threshold (harmless dose), it will be necessary to recalculate the amount of damages for health damage caused by low-dose radiation exposure in the

nuclear power plant accident cases. For this reason, I would like to explore whether there are any hints for the nuclear power plant accident from the threshold assumption in the Japanese A-bomb lawsuits still in litigation.

In other words, the purpose of this paper is to examine the possibility that these cases will have an impact on the nuclear power plant accident lawsuits in light of the 100 mSv theory and the court decisions in the A-Bomb lawsuits.

2. A-Bomb «Black Rain» Lawsuit

2.1. Outline

The A-bomb «Black Rain» lawsuits are trial filed by people who were exposed to the «Black Rain» immediately after the A-Bombings (Hibakusha) against the prefectures and cities of Hiroshima and Nagasaki, demanding recognition as Hibakusha.

The «Black Rain» is the black, muddy, oily rain that fell from the fire clouds that formed immediately after the A-Bombs exploded. The «Black Rain» contained a very large number of radioactive particles [2].

The main issue in the lawsuit is the interpretation of Article 1, No. 3 of the A-Bomb Survivors Relief Law, which stipulates that «a person who was under the circumstances where his or her body was affected by the A-Bomb radiation» (No.3 Hibakusha).

2.1.1. Hiroshima High Ct., 14 July 2021 (Hanrei Jiho No. 2521, p. 5)

The Hiroshima High Court upheld the decision of the lower court, dismissed the appeals of Hiroshima Prefecture, Hiroshima City and the Minister of Health, Labour and Welfare, and recognized all 84 plaintiffs who were exposed to the «Black Rain» of the Hiroshima A-Bomb outside the government-designated compensation area as Hibakusha (No. 3 Hibakusha). The defendants have accepted the decision by refusing to appeal to the Supreme Court. As a result, the decision of the Hiroshima High Court became final.

2.1.2. Nagasaki District Ct., 9 September 2024 (appeal; no Official Publications)

The 44 plaintiffs (including 4 who died) were «A-Bomb Survivors» who were exposed to the A-Bombing of Nagasaki but were outside the areas designated by the Japanese government at the time of the bombing and were therefore not recognised as Hibakusha. The Nagasaki District Court found that 15 of the plaintiffs (including 2 who died) were No. e Hibakusha because they were exposed to the «Black Rain» in a specific area (Higashi Nagasaki area). However, the court rejected the claims of the 29 plaintiffs who were in other areas.

2.2. Threshold Assumption in the A-Bomb Cases

This section focuses only on the parts of the two decisions concerning threshold theory.

2.2.1. Hiroshima A-Bomb Decision

The first, the Hiroshima High Court judged the effects of the «Black Rain» on the human body (internal radiation exposure) as follows. In the area where the «Black Rain» falls, there are radioactive particles, and people are internally exposed to radiation through breathing, whether they are hit by the rain or not. In addition, the black rain contaminates the surface of vegetables and other crops grown on the ground, resulting in the contamination of the crops, and the black rain also contaminates the soil, and the radioactive particles are absorbed by the roots, resulting in the contamination of the crops. Eating these crops causes internal exposure to radiation. In addition, when the Black Rain comes into contact with water from ponds and rivers, the water becomes a source of internal radiation exposure.

The second, Hiroshima Prefecture and Hiroshima City will adopt a threshold theory of low-dose exposure based on current scientific evidence. In other words, it is not certain whether exposure to radiation below 100 mSv will cause health damage or not, and it is also possible that there will be no health effects on the human body. The court also said that the internal radiation dose was extremely low and that the risk of health damage could not be generalized. In other words, the court did not reject the argument of the prefectural and city authorities that there was no possibility that low doses of internal radiation exposure could cause health problems.

2.2.2. Nagasaki A-Bomb Decision

Firstly, the Nagasaki District Court judged that there are two types of effects of radiation on the human body: qualitative effects and quantitative effects, and there is a dispute as to whether there is a threshold dose for qualitative effects or not. The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and the International Commission on Radiological Protection (ICRP) have adopted what is known as the Linear Non-Threshold (LNT) model, which states that radiation risk decreases with dose but does not become zero.

The ICRP is an independent, non-governmental, international scientific organization composed of world-class scientists and experts in radiation protection, and its recommendations are widely recognized as the international standard for radiation protection. Each government implements individual radiation protection measures based on the basic concepts presented in the ICRP recommendations and the radiation protection guidelines developed by the International Atomic Energy Agency (IAEA). This is because the adequacy of the content of the ICRP recommendations is highly respected.

In addition, the Nagasaki case states that, with regard to the threshold assumption, it has not yet been proven whether cancer can be induced by exposure to doses below 100 mSv, even with the combined epidemiological and biological evidence to date. The experts point out that this is an open scientific question. However, the court did not accept the plaintiffs' argument, stating that it is not yet accepted scientific evidence that the risk of cancer is increased by internal exposure to high doses of radiation in a given localized area.

2.3. Summary

The Nagasaki decision was the first court case for the relief of radiation exposure victims who claimed similar health problems caused by radioactive fallout after the Hiroshima High Court decision that recognized all 84 plaintiffs exposed to the «Black Rain» of the Hiroshima A-Bomb as Hibakusha. Therefore, it was expected that the Nagasaki District Court would follow the Hiroshima High Court's decision. However, this did not happen. But why were such different decisions made for the same victims of the A-Bombings?

The Nagasaki decision suggests that there were differences in the historical backgrounds of the movements for expanding compensation in Hiroshima and Nagasaki prefectures, and that there were differences in the «Black Rain» issues in the cases of the two prefectures. For example, Hiroshima has long demanded that the «Black Rain» be investigated and studied, and that the area where it fell be included in the area of the A-bombed city. Nagasaki, on the other hand, has sought to correct the problem of imbalance in the A-bombed cities.

In Hiroshima, it is a well-known fact that «Black Rain» began to fall 20 to 30 minutes after the explosion of the Hiroshima A-Bomb, and it has been investigated and studied for many years as a campaign to expand the area exposed to radiation («Uda Rain Area» in 1953; «Masuda Rain Area» in 1989, which is approximately four times larger than «Uda Area»; «Otaki Rain Area» in 2010, which is about six times larger than «Uda Area»).

In Nagasaki, on the other hand, the geographical characteristics of the old Nagasaki city, which is long in the north-south direction and narrow in the east-west direction, caused an imbalance in the designation of the A-bombed areas between the north-south direction and the east-west direction based on the A-bomb hypocentre. This was because, according to the A-Bomb Medical Care Law, the A-bombed areas were designated on the basis of the administrative districts of the time. Therefore, in Nagasaki, it has been important for so long to correct this imbalance. In addition, the area of the «Black Rain» from the Nagasaki A-bomb was more limited than that of the Hiroshima A-bomb, and there was a lack of research and surveys on the subject, making it difficult to determine the area of the «Black Rain» in a definitive way.

The Second, regarding the threshold for low-dose radiation exposure, the Hiroshima decision necessarily relied on international findings to set the threshold and did not reject health effects at doses of 100 mSv or less. On the other hand, the Nagasaki decision relied on existing international evidence and, assuming a threshold, denied any health hazard at low doses of radiation.

In contrast to previous court decisions on the health effects of A-Bombs, the Hiroshima High Court largely recognized the health effects of internal radiation exposure without relying on scientific dose estimates. The Hiroshima High Court, unlike previous court decisions on the health effects of A-Bombs, broadly recognized the health effects of internal radiation exposure without relying on scientific dose estimates, because it cannot be said that there is no possibility of health damage from low doses of internal radiation exposure. On this point, I think the Hiroshima and Nagasaki decisions had different results in their decisions.

3. Nuclear Power Plant «White Snow» Lawsuit

3.1. Outline

A nuclear power plant lawsuit is a class action lawsuit filed by plaintiffs (3,864 at the time of filing) from Fukushima and neighbouring prefectures who were forced to evacuate their former hometowns due to the accident at the Fukushima 1st Nuclear Power Plant caused by the tsunami resulting from the Great East Japan Earthquake against TEPCO and the Government of Japan, claiming compensation for damages, etc.

On 17 June 2022, the Supreme Court of Japan (Hanrei Jiho No. 2546, p. 5) issued a decision that, for the first time in a class action lawsuit related to the nuclear accident, found TEPCO to be negligent (rejecting the responsibility of the Japanese government). The case is still pending in seven high courts and district courts, in each.

The word «White Snow» means that it was snowing in Fukushima at the time of the nuclear accident, and this snow have contained a high level of radioactive substances released into the atmosphere; the original is a quote from Kenichi Ido, attorney at law and leader of the plaintiffs' legal team in the children's thyroid cancer lawsuits. Listening to his online presentation (30 April and 26 December 2022), I learned this phrase [3].

3.2. Threshold Assumption in Nuclear Power Plant Cases

Although the Supreme Court examined the government's responsibility, the health effects of low-dose radiation exposure, which is the focus of this paper, were referred by the Sendai High Court (the fact-finding court of the original trial), and it was accepted by the Supreme Court. Therefore, this paper refers to the arguments of the Court of Appeals regarding the scientific rationale for low-dose radiation exposure accepted by the Court (for details on the four High Court decisions, see [4]).

Regarding the scientific findings of the Japanese Supreme Court's decision on low-dose radiation exposure, the Sendai High Ct., 30 September 2020, made two main distinctions between the effects of radiation on the human body: deterministic effects and stochastic effects. The former includes acute damage, leukopenia, and cataracts, and there are no deterministic effects below 100 mSv (with a threshold). On the other hand, the occurrence of cancer is a stochastic effect, and in the range above 100 mSv, the risk of cancer increases with radiation dose. However, at doses below 100 mSv, the court has said that it is very difficult to prove epidemiologically a clear increase in cancer risk due to radiation because the dose is so small that it is masked

by the effect of cancer caused by other factors. In other words, in the nuclear power plant case, the Japanese Supreme Court adopted the traditional international findings and upheld the existence of a threshold.

3.3. Summary

Annex A (A86) of the ICRP 2007 Recommendations and the risk to the solid eye from radiation was suddenly changed from 10 mGy (ICRP 2005 Publication 99) to 100 mSv (ICRP 2007 Publication 103) [5]. As a result, there is no increase in cancer in Japan from exposure below 100 mSv, and there are claims that the high incidence of thyroid cancer in Fukushima is an accidental overdiagnosis. However, the fact is that there are also many research papers that have reported an increased risk of cancer at exposures below 100 mSv. Nevertheless, I have already pointed out in another paper that the Japanese Supreme Court's adoption of the views of international organisations as «scientific findings» is not convincing [6]. In particular, the international findings on the threshold theory relied upon by the Japanese Supreme Court need to be re-examined.

4. Conclusion

To summarise this paper, I will discuss whether the threshold argument outlined in the A-bomb cases has any implications for the nuclear power plant cases. And I also will discuss the potential of the threshold theory in nuclear power plant lawsuits in light of the latest Interim Guidelines.

4.1. Hints from the A-Bomb Cases to the Nuclear Power Plant Cases

In the A-Bomb «Black Rain» lawsuit, the Hiroshima High Court recognized that even if they were not exposed to the black rain, people living in the area of the black rain could suffer health damage due to internal radiation exposure by absorbing radioactive particles into their bodies. In other words, the court recognized all the plaintiffs as A-Bomb survivors because it is difficult to deny that even those who were indirectly exposed to radiation from the A-Bombs can suffer health damage from radiation.

The defendants, Hiroshima Prefecture and Hiroshima City, have pointed out that, in light of current scientific findings regarding low-dose radiation exposure, it is not certain whether or not health damage can occur in cases of exposure to radiation doses of 100 mSv or less. It is also possible that no health effects may occur in the human body. Furthermore, they argued that the internal radiation dose was extremely low and that the risk of health damage could not be generalized.

On the other hand, the Hiroshima High Court, in contrast to the precedent cases on the health effects of A-Bombs, broadly recognized the health effects of internal radiation exposure without resorting to scientific dose estimation. This is because it cannot be said that there is no possibility of health effects from low doses of internal radiation exposure. The Hiroshima decision is significant because it contributes to the relief of victims by adopting scientific findings that differ from the Supreme Court's decision on the Fukushima accident.

However, the Hiroshima decision does not examine in depth the international evidence on low-dose radiation exposure. Therefore, the cause-and-effect relation between low-dose radiation exposure and health damage is not necessarily quantitative, but rather qualitative. In my opinion, this is problematic from the perspective of an objective calculation of the damage caused by the nuclear power plant accident.

4.2. Fifth Supplement to the Interim Guideline [7]

The guideline formulated by the Nuclear Damage Dispute Review Board (established under Article 18 of the Nuclear Damage Compensation Law) plays an important role in the compensation of victims of the Fukushima nuclear accident. This is the so-called «Interim Guideline». The guideline was first formulated on 5 August 2011 and has been updated several times: 1st (6 December 2011), 2nd (16 March 2012), 3rd (30 January 2013) and 4th (26 December 2013). The latest version is the Fifth Supplement (20 December 2022).

As noted in Section 3, the Supreme Court's decision finalised the High Court decisions on four class action lawsuits regarding the number of damages awarded by TEPCO. The amount of compensation for «mental damages» awarded in this final decision exceeded the previous guidelines. Therefore, a fifth Supplement to the Guidelines was formulated to revise the previous Guidelines.

In addition, the Fifth Supplement also emphasises that this Guideline is not the upper limit of compensation. In other words, all damages that are recognised as having a reasonable causal relation according to the individual and specific circumstances are fully compensable. The Fifth Supplement has revised the amount of compensation, in particular for mental suffering. Finally, the amount of compensation for people living in evacuation zones has been increased. Further details will be considered in a new paper. In addition, this Guidelines recognise «compensation for loss of livelihood» and «compensation for change in livelihood». The former refers to mental damage caused by the extreme changes in the living environment of people living in the difficult-to-return zones, etc., compared to the situation before the accident. The latter is mental damage caused by the serious damage to the victim's living environment in the restricted residential zone, the evacuation order preparation zone and the emergency evacuation preparation zone. As a rough estimate, the amount of compensation for the latter is less than half of that for the former.

Furthermore, the Fifth Supplement basically calculates the number of damages based on the traditional tort theory of the extent of damages. However, the damages caused by the nuclear power plant accident are special and unprecedented in scale, scope and duration. Therefore, it is necessary to fully consider various circumstances specific to the nuclear accident when awarding damages in this case. In this regard, it is remarkable that the mental dis-

tress caused by the severe evacuation conditions and the mental distress caused by the disruption of the maintenance and continuation of daily life has been considered. On the other hand, the study does not necessarily take into account the so-called «voluntary evacuees» because it does not expand or rebuild the evacuation zones [8]. In my opinion, this is due to the fact that the previous theory was used as the basis for calculating the causal relation for low-dose radiation exposure, despite the special characteristics of the nuclear power plant accident.

In the next revision, it is necessary to reconsider the validity of the international findings on low-dose radiation exposure adopted in the A-bomb and nuclear power plant studies mentioned in this paper. This should be done in order to fully take into account the special characteristics of nuclear power plant accidents and to calculate the mental distress that would contribute to the relief of voluntary evacuees. For this purpose, many studies that deny the existence of a threshold may be useful; for health effects of radioactive fallout and nuclear power plants [9].

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