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STATE RESPONSIBILITY IN THE DISPOSAL OF RADIOACTIVE SUBSTANCES IN THE ASIA-PACIFIC AREA (CASE STUDY ON JAPAN'S DISPOSAL OF NUCLEAR WASTE IN FUKUSHIMA WATERS)

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Abstract

This research aims to find out and examine Japan's responsibility for disposing of radioactive waste in the waters of the Asia Pacific region and to find out and understand the steps that the IAEA should take in resolving the disposal of radioactive waste in the waters of the Asia Pacific region by Japan. This research method uses a type of normative legal research, namely by taking a conceptual approach and a case approach. The actions taken by Japan give rise to responsibilities that must be fulfilled because they violate obligations in several principles and provisions of international law. Actions in disposing of radioactive by Japan have received approval from the IAEA because the level or content of radioactive waste disposed of by Japan is still classified as safe as per the results of laboratory research carried out by TEPCO and the IAEA.
Keywords: state responsibility, radioactive waste, IAEA

Abstrak

Penelitian ini bertujuan untuk mengetahui dan mengkaji tanggung jawab Jepang dalam pembuangan limbah zat radioaktif di perairan kawasan Asia Pasifik dan untuk mengetahui dan memahami langkah yang sebaiknya dilakukan IAEA dalam penyelesaian pembuangan limbah zat radioaktif di perairan kawasan Asia Pasifik oleh Jepang. Metode penelitian ini menggunakan jenis penelitian hukum normatif, yaitu dengan cara melakukan pendekatan konseptual dan pendekatan kasus. Tindakan yang dilakukan oleh Jepang menimbulkan tanggung jawab yang harus dipenuhi, karena adanya pelanggaran kewajiban dalam beberapa prinsip dan ketentuan hukum internasional. Tindakan dalam pembuangan limbah zat radioaktif yang dilakukan oleh Jepang telah mendapat persetujuan dari IAEA, karena kadar atau kandungan limbah zat radioaktif yang dibuang oleh Jepang masi tergolong aman sebagaimana hasil penelitian laboratorium yang dilakukan oleh TEPCO dan IAEA.
Kata kunci : tanggung jawab negara, limbah zat radioaktif, IAEA

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A. INTRODUCTION

Because Japan is located in the *Ring of Fire*[1] region, Japan often experiences natural disasters such as earthquakes and volcanic eruptions.[2] One of the nuclear incidents that occurred in Japan that caused public perception to begin to reject and protest the use of nuclear reactors, was the Fukushima Daiichi nuclear disaster.[3]

The Fukushima Daiichi disaster was a natural disaster of a 9.0 magnitude earthquake, followed by a massive tsunami that occurred on March 11 2011, resulting in the destruction of various reactor infrastructure at the Nuclear Power Plant. A few days after the incident, there was an explosion caused by the reaction between water and fuel into gas which automatically shut down the entire Fuushima NPP.[4] As a result of this leak, the Fukushima region was completely shut down and unable to operate the pumping system that cools the reactor terraces and fuel storage pool, resulting in a very drastic rise in temperature.[5]

It also impact the environment and public health, which affects the country's energy policy and economic.[6] After the Fukushima Daiichi earthquake in 2011, the Japanese government and *Tokyo Electric Power Co* (TEPCO) made policies to deal with the impact of the disaster, by making new laws on renewable energy and reducing greenhouse gas emissions.[7]

This law then provides compensation to disaster victims and makes efforts to restore the environment affected by radiation.[8] In addition, as a member of the *International Atomic Energy Agency* or (IAEA) Japan has the right to get help listed in two conventions namely, *Convention on Assistance in the Case of A Nuclear Accident or Radiological*;[9] and *Convention on Early Notification of a Nuclear Accident*.[10] [11]Which is where every member of the IAEA who experiences an event or condition where there is a discrepancy in the development of the implementation of nuclear technology in his country will assistance from the IAEA.[12]Mid-2023 became a very scary moment for the whole world, because

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1 *Ring of Fire* namely a track where there are rows of volcanoes, so it is not surprising that the country that passes through this ring of fire often experiences earthquakes, both tectonic and volcanic. Based on expert records, as many as 81 % of large earthquakes occur in the Pacific Ring of Fire (Prasetya et al., 2006). Accessed September 13, 2023, at: 22:39.

2 Khairunnisa Andri et al. all,*Analysis of Natural Disaster Management and NaTech to Build Disaster Resilience and Sustainable Society in Japan*, NUSANTARA: Journal of Social Sciences, Vol. 7, no. 2 of 2010, p: 363. Accessed September 12, 2023, at: 13:00.

3 *Ibid*, hlm: 365.

4 Aprilia Mawaddah, Maria Maya Lestari, and Lady Diana,*Legal Analysis of the Plan to Dispose of Nuclear Waste into the Sea After the Earthquake and Tsunami in Japan*, Journal of Law and Constitutional Studies, Vol.1, No.2 June 2023, Pg: 93. Accessed on September 14 2023, at: 16:00.

5 *Ibid*, hlm:94.

6 Upik Sarjiati,*Nuclear Risk and Public Response to the Fukushima Nuclear Disaster in Japan*, Journal of Regional Studies, June 2018, p: 44, accessed 12 September 2023.

7 Julian Ryall, *A Decade of the Fukushima Nuclear Disaster*, Deutsche Welle, 11 March 2023 2021, p, 1. Retrieved 14 September 2023, at: 12:00.

8 Upik Sarijati,*Place. how*, hlm: 46.

9 The Convention on Assistance in Nuclear Accidents contains the IAEA's involvement in assisting member countries that experience accidents in the nuclear production and development process. Accessed September 18, 2023, at: 13:00.

10 The Convention on Early Warning of Nuclear Accidents states that the IAEA must respond quickly to early warnings from each member country if there are symptoms of an accident in nuclear energy. Accessed September 18, 2023, at: 13:00.

11 (http://http://www.iaea.org/Publications/Documents/Convention s/index.html). Accessed September 17, 2023, at: 17:00.

12 Chrisnanta Amijaya,*The Role of the International Atomic Energy Agency (Iaea) Through the International Fact Finding Expert Mission of The Fukushima in Handling Nuclear Reactor*

of the controversial move of the Japanese government to issue a statement regarding the disposal of nuclear waste into the marine environment as a solution to the impact of the natural disaster 12 years ago. The reason for Japan to dump nuclear waste into the marine environment is because of the limited storage space for nuclear waste at the Fukushima nuclear power plant, which resulted in large-scale stockpiling of nuclear waste and then accommodated in tanks that can fill more than 500 international Olympic swimming pools.[13]

In the disposal of nuclear waste into the marine environment, the Japanese government does not merely directly dispose of the nuclear waste, but Japan and TEPCO carry out screening or filtration using the Advanced Liquid Processing System (ALPS) technique[14].[15] This technique starts from the stage of collecting nuclear wastewater contaminated with radioactive material, which is then carried out a physical filtering process to remove particles of radioactive material and only leave tritium according to standards from the IAEA.[16]

However, if realized, this will be one of the causes of global marine environmental pollution, because the disposal of nuclear waste will cause losses and negative reactions from various parties. It should be noted that radioactive substances have a long period of time in the decay process, or the impact is accumulative, which means that it will be seen in the next five to ten years.[17]

This will certainly have an impact on the health of marine ecosystems, causing various losses for animals and humans ranging from headaches, epilepsy, cancer, to death.[18] In addition, the long-term effects of radioactive substances can reduce the quality of seawater use and reduce comfort, which is not only felt in Japan but also in areas outside the country's jurisdiction or across national borders.[19]

However, Japan's actions in dumping nuclear waste into the sea should not be considered completely correct, because this is certainly contrary to several articles in international conventions. Japan as a country that has ratified one of the instruments in international law, namely the United Nations Convention on the Law of the Sea or hereinafter referred to as UNCLOS 1982 in article 192 states that every country must protect the marine environment, which means that this article emphasizes the marine ecosystem that must be maintained and preserved by every country.[20]

So that it requires a responsibility from Japan as a country that disposes of nuclear waste in the marine environment. Because in the principle of state responsibility, which can be used as a legal basis for each country in the event of damage and / or nuclear

13 https://www.bbc.com/news/world-asia-56252695

14 APLS is a pumping and filtration system, which uses a series of chemical reactions to remove 62 radionuclides from contaminated water. However, ALPS is unable to remove tritium from contaminated water.

15 https://www.iaea.org/topics/response/fukushima-daiichi-nuclearaccident/fukushima- daii-chi-alps-treated-water-discharge/faq

16 https://theconversation.com/bagaimana-limbah-pltn-fukushima-dapat-berdampak-pada-laut- in-donesia-212868

17 Stevanni Thalia Pandi, Natalia Lengkong, and Kathleen Pontoh,*Legal Study of Nuclear Waste Disposal in the Sea According to International Environmental Law*, March 2022, p. 2. Accessed on September 17, 2023, at: 22:00.

18 *Ibid,*hlm. 3.

19 Irsan,*Compensation for Marine Pollution from National and International Legal Perspectives*, Legal Pluralism : Vol. 6, No1, January 2016, p. 52. Accessed September 17, 2023, at: 22:30.

20 Stevanni Thalia Pandi,*cit*, hlm. 4.

accidents that cause transboundary pollution, namely pollution carried out by a country or

individual within the jurisdiction of the country which then causes environmental impacts on other countries.[21]

TEPCO and the Japanese government say that the discharged wastewater has been filtered to reduce radioactive isotopes and leave only tritium to meet safety standards.[22] But still, the dumping of radioactive waste into Pacific waters will pose risks and dangers to humans and marine ecosystems. The loss that Japan's neighboring countries have faced in this case certainly creates an obligation for Japan to take responsibility for both material and immaterial losses.

International law recognizes two types of state responsibility, namely international responsibility and international liability based on fault. What is meant by international responsibility is that state responsibility will arise if the state has a bond to a provision, then the state violates it, causing liability. Meanwhile, what is meant by international liability based on fault is that the state has committed an error or negligence because of its own actions and caused harm to others, so state responsibility arises.[23]

Based on this background description, the researcher is interested in discussing it further in this thesis entitled: ***"STATE RESPONSIBILITY IN THE DISPOSAL OF RADIOACTIVE SUBSTANCES IN THE ASIA-PACIFIC AREA (Case Study on*** Japan's Disposal of Nuclear Waste in Fukushima Waters)"

B. METHODS

The type of research the author uses is normative legal research. Normative legal research is conceptualized as a rule or norm that is a benchmark for human behavior that is considered appropriate. The source of normative legal research is secondary data consisting of primary legal materials, secondary legal materials, and tertiary legal materials.[24] The approaches used in this research are the international treaty approach (statute approach), conceptual approach (conceptual approach), and case approach (case approach).

C. ANALYSIS AND DISCUSSION

1. Japan's Liability for Manufacturing Radioactive Substances in Asia Pacific Waters Under International Law

a) Analysis of Key Principles of International Environmental Law in Japan's Manufacture of Radioactive Substances in Asia Pacific Waters

21 Sukanda Husin,*International Environmental Law,*PUSBANGDIK, Riau University, Pekanbaru, 2009, p. 119.

22 *Ibid,*

23 Neni Ruhaeni,*Development of the Principles of Responsibility (Bases of Liability) in International Law and Their Implications for Space Activities,* Bandung Islamic University Faculty of Law, IUS QUIA IUSTUM Law Journal NO. 3 VOL. July 21, 2014, p. 5. Accessed on October 7, 2023, at 12:00.

24 Amiruddin and Zainal Asikin,*Introduction to Legal Research Methods*, PT. RajaGrafindo, Depok, 2020, p. 118. Accessed on September 10, 2023, at: 08:00.

Japan is one of the countries that uses nuclear power plants to meet the electricity needs of its citizens. In 2011 Japan was hit by a natural disaster in the form of an earthquake and tsunami which caused the nuclear power plant in the Fukushima Daiichi region to experience severe damage to three nuclear reactors, this resulted in the activities of the Fukushima Daiichi nuclear power plant being completely shut down. However, TEPCO as a Japanese power generation company continues to produce water to cool the nuclear reactors, which means that the nuclear reactors continue to produce water containing radioactive substances from nuclear reactors every day.

The water from the remaining cooling of the nuclear reactor is then filtered and processed using an Advanced Liquid Processing system (ALPS) which is then stored in 1000 large tanks which have been filled to 98 % of the capacity which reaches 1.37

million tons The water from the remaining nuclear reactor cooling is then filtered and processed using the Advanced Liquid Processing System (ALPS) which is then stored in 1000 large tanks that have been filled with 98 % of the capacity of 1.37 million tons.[25] What is believed in the development, the increasing amount of water stored in the tanks caused the Japanese government and TEPCO to claim that they lacked land to occupy the tanks and the Japanese government wanted to build new nuclear reactors to replace nuclear reactors that had been decommissioned due to disaster damage, the story has run out of options in dealing with radioactive waste.

For this reason, the Japanese government ventured to make a decision to dispose of the waste of the Fukushima Daicii Nuclear Power Plant (PLTN) into the Pacific Ocean, which was carried out on August 24, 2023. In the process of dumping the nuclear waste into the sea, Japan confidently guarantees that the nuclear waste to be disposed of into the sea has been reduced in radioactive levels and has reached acceptable safety standards. In addition, the filtering system using the ALPS technique carried out by Japan can reduce the isotope content and leave only tritium, where tritium has a low level of radiation level and is considered harmless.

When the Japanese government made a notification to dispose of nuclear waste at sea, they said that the action taken had received permission from the UN nuclear watchdog agency, the International Atomic Energy Agency (IAEA). However, Japan's plan to dispose of nuclear waste experienced a lot of criticism from various parties, both domestically such as fishermen, anti-nuclear activists, and the general public as well as internationally such as China, South Korea, Hong Kong, and other countries.

This is due to the parties' concerns over actions that could have a negative impact on the environment, especially the marine environment and long-term public health. Because the sea has great benefits and roles for human life, which means that anyone can utilize the sea for the benefit of all humans. Of course, this is not in line with Japan's actions to dump nuclear waste or radioactive substances into the sea without regard for global environmental conditions.

In the development of law in the field of international environmental management and protection, it usually begins with making soft law tools such as declarations and resolutions, then followed by hard law actions formed through international conferences

25 Fatiyah Wardah, Greenpeace Indonesia, Fukushima Radioactive Waste Water Disposal Threatens Waterways, Voaindonesia.com.

and meetings such as conventions and protocols.[26] Soft law is a form of international law that is not directly binding on the state but must be guided to form the future law. While hard law is a form of international law that has binding power on contracting parties directly in accordance with the principle of pacta sunt servanda[27].[28]

One form of soft law (*soft* law) in international environmental law which serves as a guideline for protecting the environment is the 1972 Stockholm Declaration.[29] The 1972 Stockholm Declaration is one of the results of the Summit on the human

environment or known as the United Nations Conference on Human Environment where countries in the world are asked to carry out development to improve and improve the standard of living of today's generation without reducing the rights of future generations to enjoy a good and healthy environment or commonly called Sustainable Development.

For the future balance of environmental law, the 1972 Stockholm Declaration codified the principles or adages of customary international law as contained in Principle 21 which reads:[30]

"State have, in accordance with the Charter of the United Nations and The Principles of international law, the sovereign right to exploit their own resources pursuant to their environmental policies, and responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other state or areas beyond the limits of national jurisdiction."[31]

From the legal principles codified by the 1972 Stockholm Declaration, there are three principles, namely the principle of territorial state or sovereignty, the principle of sic utere tuo ut alienum non laedas good neighborliness and duties to cooperate, and the principle of state responsibility. Where in these principles it is clearly stated regarding the granting of rights to the state to utilize the marine environment to meet the needs of its population, but still pay attention to the limits and responsibilities that arise if the utilization of the marine environment suffers loss or damage to other countries.

The principle of state responsibility explains the form of responsibility of a state if its activities cause harm to other countries. In relation to the Japanese government's decision to dispose of water containing radioactive substances into the Pacific Ocean, it can cause transboundary pollution to the environment, especially the marine environment.

Because the discharged radioactive substances can be carried by ocean currents, which can endanger the condition of the marine environment outside Japan's jurisdiction. So

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26 Sukanda Husi,*International Environmental Law,*PT RAJAGRAFINDOPERSADA Jakata, 2016, p. 21.

27 Basic*agreements are to be kept*is one of the basic norms (*grundnorm;basic norm*) in law, and is closely related to the principle of good faith to respect or obey agreements. Accessed in Harry Purwanto's journal,*The existence of the Pacta Sunt Servanda Principle in International Agreements,*Pulpit Law Volume 21, Number 1, February 2009, p. 155-170.

28 *On. cit,*hlm. 22.

29 The Stockholm Declaration is a declaration made at the Human Environment conference held by the UN in 1972. This declaration is also referred to as the UN Declaration on the Human Environment and was followed by UN member states at that time. This conference was held in the city of Stockholm, Sweden from 5 June 1972 to 16 June 1972. This declaration was attended and signed by 114 representatives of UN member countries (including Indonesia and Panama).https://www.zonareferensi.com/deklarasi-stockholm-1972/

30 Kiss Alexandre and Dinah Shelton,*Guide to International Environmental Law,* Martinus Nijhoff Publishers: Boston, hlm. 31.

31 Prinsip 21 Stockholm Declaration.

that it will cause legal consequences that must be carried out by Japan who pollutes. While the provisions in Principle 22 of the Stockholm Declaration relate to the issue of responsibility and compensation for victims of pollution due to the disposal of radioactive substance waste in the marine environment by Japan.

International environmental law is a branch of international law, in which international environmental law regulates the rights and obligations of states to respect the natural environment, including the environment of other countries, the environment beyond the limits of national jurisdiction, and the environment as a whole. In addition, international environmental law also regulates the principles developed by the regulatory system on the environment, both national, international, and transnational to protect the environment and natural resources.

In reality, the application of the principles of international environmental law does not necessarily go well, this is due to the lack of awareness of each country to implement the principles as an obligation to maintain and protect the marine environment. One of them is in the actions taken by Japan by disposing of radioactive substance waste in the marine environment, of course the actions taken by Japan are contrary to several principles in international environmental law, among others:[32]

1) *The Good Neighbourliness Principle*

   According to this principle, it is explained that a country should not take actions within its country, which can cause environmental pollution in other countries. It can be said that the actions taken by Japan have violated the principle of good neighbors because it disposes of waste containing radioactive substances that can pollute the marine environment of surrounding countries or globally. Even though Japan disposed of the radioactive waste in its jurisdiction, Japan's actions cannot be justified.

2) *Duty to prevent, reduce and control environmental harm*

   It is a principle that obliges a country to avoid actions that can cause damage in the territory of another country. This principle is in line with the precautionary principle, where a state must be careful in carrying out an action that has the potential to cause environmental damage. It is clear that countries are asked not to take actions that are harmful to the marine environment, of course this is different from Japan's actions. So it can be said that Japan violated the principle of prevention of damage and precaution in international environmental law.

3) *The Duty to Inform Principle*

   This principle explains that every country must carry out international cooperation in overcoming global environmental damage through international cooperation by providing information about the causes of damage and how to overcome this damage. However, in reality, the Japanese government does not apply this principle, as evidenced by the many rejections from countries or the international community that do not accept Japan's decision not to care about the condition of the marine environment in the future by disposing of radioactive waste from nuclear power plants.

32 Sukanda Husi,*International Environmental Law,*PT RAJAGRAFINDOPERSADA Jakarta, 2016, p. 273

4) *The Polluter Pays Principle*

This principle emphasizes economics rather than law, because it regulates the policy of calculating the value of damage and its burden. Thus, the party causing the pollution will be charged both for the prevention of pollution and for repairing the damage caused by the pollution.

In the development of the act of waste disposal carried out by Japan until now there has been no such impact, but if there is damage and loss experienced by the surrounding countries, then Japan must be responsible in accordance with the agreement between the countries.

5) *Common Concern Principle*

This principle states that every country or international community has the right and obligation to be concerned about the environment globally, which means that environmental issues cannot be viewed only in the context of national jurisdiction. This obligation is also called erga omnes, so anyone can reject or criticize Japan for its actions. Because Japan's actions can damage the marine environment and endanger the ecosystems that exist in it.

b) Analysis of International Legal Instruments in the Manufacture of Radioactive Substances in Asia Pacific Waters by Japan

International law does not prohibit the use of nuclear power for peaceful purposes, such as nuclear power plants. However, the use of nuclear power for nuclear power plants must also be based on the principle of safety, which is believed in international law to be regulated in several conventions, one of which is the Convention On Nuclear Safety.

In the use of nuclear energy, it is inseparable from the risks and impacts that arise in the future, such as what happened at the Japanese nuclear power plant, precisely in the Fukushima area which is on the coast or classified as a disaster- prone area. Based on the provisions of Article 1, the purpose of the Convention on Nuclear Safety is:[33]

[33]*To achieve and maintain a high level of nuclear safety worldwide through the enhancement of national measures and international cooperation including, where appropriate, safety-related technical cooperation;*

1) *To establish and maintain effective deficiencies in nuclear installations against potential radiological hazards in order to protect individuals, society and the environment from harmful effects of ionizing radiation from such installations;*
2) *To prevent accidents with radiological consequences and to mitigate such consequences should they occur*.

Based on the provisions of Article 1 above, it means that the safety aspect is very important in the establishment of nuclear installations in this case nuclear power plants, so that steps must be taken before establishing nuclear power plants. But in reality, Japan does not pay attention to the safety aspects referred to in this convention, which is evidenced by Japan not paying attention to the geological conditions where the NPP is established.

33 Article 1 of the Convention on Nuclear Safety

Where the Fukushima NPP is on the beach or directly adjacent to the beach directly facing the Pacific Ocean, and also the history of Japan which often experiences earthquakes and tsunamis. So that the establishment of nuclear power plants located on the beach by Japan needs to be reviewed. In addition, the Japanese government did not pay attention to the requirements or safety standardization in the NPP working system, which caused that at the time of the accident there was no alternative way to reduce the level of damage or leakage that occurred.

The head of the nuclear regulatory agency, Shinjo Kinjo regretted the slow pace at which the operator dealt with this issue, saying that TEPCO could not solve this problem alone because this was one of the worst accidents ever. Therefore, the Japanese government asked the IAEA for help as an international nuclear organization that promotes the safe, secure, and peaceful use of nuclear technology.

Then the IAEA made a special team to investigate the accident that occurred at the Fukushima NPP, and the team found that there were several mistakes such as the regulation of nuclear power plant construction, improper diesel laying, and anticipation of external hazards that were not considered by the Japanese Government.

In December 2011 TEPCO made a report, which said that the accident was unexpected, but actually before the accident occurred there were warnings that a major disaster would occur in Japan but TEPCO ignored these warnings by not making alternative efforts in the event of an emergency disaster.

But on the other hand in the regulation of the establishment of the NPP, it shows that Japan also violates the provisions in Article 15 of the Convention on Nuclear Safety 1994, namely:[34]

Each Contracting Party shall take the appropriate steps to ensure that there are on-site and off-site emergency plans that are routinely tested for nuclear installations and cover the activities to be carried out in the event of an emergency. For any new nuclear installation, such plans shall be prepared and tested before it commence operation above a low power level agreed by the regulatory body.

From the explanation of Article 15, it shows that the Convention on Nuclear Safety has a very important role because this convention aims to involve the participation of countries that operate nuclear power plants to maintain a high level of safety by setting international standards of nuclear safety that must be adhered to by countries, especially in terms of nuclear utilization for peaceful purposes.

According to international law, the sources of marine pollution can be grouped into five, namely pollution originating from ships (vessel-sourced), offshore oil exploration activities (offshore drilling), dumping, and land-based marine pollution, and air. Of the five types of marine pollution sources, land- based marine pollution contributes the most to international marine pollution with a percentage of 80 %.[35]

Land-based marine pollution has a broad definition, according to UNCLOS in Article 207 defines Land-based marine pollution as a series of human activities carried out on land that cause marine pollution through rivers, coasts, pipelines, and discharge structures. Meanwhile, according to The 1958 Montreal Guidelines for the Protection

34 Article 16 paragraph (1) of the Nuclear Safety Convention

35 B. H. Ketchum, "*Man's Resources in the Marine Environment", Pollution and Marine Ecology,* Inter-Science Publishers, 1967, hlm. 3.

of the Marine Environment against Pollution from Land Based Sources (Montreal Guidelines) in Article 1 defines Land-based marine pollution as sources of marine pollution from urban, industrial, and agricultural activities, especially those coming from coastal rivers, atmospheres, and offshore activities that enter the territory of the country.[36]

When comparing the two, it can be seen that the source of land-based marine pollution is human action which is essentially grouped into four types, namely activities related to households, industry, tourism, and agriculture.[37] The activities or actions related to humans produce a lot of plastic waste, nutrients, pesticides, heavy metals, sediments, and radioactive waste.[38] It can be said that Japan's dumping of radioactive waste into the Pacific Ocean is classified as land- based pollution and has a transboundary nature that can pollute the marine environment at large.

Pollution is defined as the direct or indirect entry of substances or energy that causes damaging effects on biological resources and ecosystems that can reduce environmental functions and facilities.[39] Meanwhile, transboundary pollution is pollution originating from one country that causes consequences in other countries.[40]

This means that the actions taken by the Japanese Government will give rise to liability for the aggrieved state. It is believed that customary international law regulates violations of international obligations, by fulfilling elements such as (1) the act is attributable to the state and (2) the act is a clear violation of international law.[41]

[42]The Japanese government's decision caused debate in the international environment, because this radioactive substance is very dangerous for the health

In addition, the effects of radiation are believed to cause an increase in fish egg mortality, a decrease in the percentage of spawning, an increase in fish egg malformation stories that can wipe out fish populations.[43] with conditions that are relatively wide spread and can spread throughout the world either by land, sea, or air.[44] This results in a lack of functions from the ocean, such as: the sea is usually used as a place of recreation such as boating, water skiing, swimming, skydiving, sport fishing.

Conversely, when there is pollution, these activities are disrupted. Not only that, marine pollution due to radioactive waste disposal in the sea disrupts the commercial fishing sector, which results in the loss of opportunities and income for fishermen to catch fish, shellfish and other marine products. Moreover, the United Nations (UN) has

36 PBB (III),*The Montreal Guideline for the Protection of the Marine Environment against Pollution from Land-Based Sources,* 1985, Article 1.

37 R. P. Cote, "*Marine Environmental Management : Status and Prospective", Marine Pollution Bulletin 24,*1992. Hlm. 19.

38 *Ibid,*hlm. 20.

39 Appannagari, Ramamohana Reddy,*"Environmental Pollution Causes and Consequences: A study North Asian International Research Journal of Social Science & Humanities*", 2017, hlm. 152.

40 Junginger, Abigail, et al., "*Responsibility for Destruction and Pollution of the Marine Environment Across National Borders According to International Legal Instruments",*Law and Society IX, 2021, p. 41.

41 Article 2 of*Article on Responsibility of States for Internationally Wrongful Acts.* of the human body and the environment, which can cause abnormalities in the function of organs directly contaminated such as cancer due to radiation to the human body, genetic mutations that damage DNA in the human body which results in human offspring or physical defects.

42 https://sains.sindonews.com/read/710777/766/4-impact-radiation-nuclear-terhadap-body-human1647086630.

43 Mukhtasor,*Marine Coastal Pollution,*hlm. 112.

44 Vishnu Arya Wardhana,*Nuclear Radiation Protection Technology and Its Applications*, Adni Yogyakarta, Hlm. 264.

expressed its disappointment with the Japanese Government's decision to ignore by not implementing its obligations as a country that ratified various conventions to prevent marine pollution in this case hazardous substances, namely radioactive substances, are disposed of in the marine environment which can spread to the marine areas of surrounding countries.

There are several international provisions that can be attributed to Japan's actions in discharging radioactive waste into the marine environment, among others:

1) *United Nation Convention on the Law of the Sea* 1982 (UNCLOS of 1982)

As a Convention on the law of the sea, the 1982 UNCLOS regulates the protection of marine resources as one of the instruments in international law that has binding power, including Japan which ratified it on June 20, 1996,[45] which means that the sustainability of the marine environment is very important to be maintained from marine pollution.

The 1982 UNCLOS does not clearly regulate the prohibition of radioactive waste disposal into the marine environment. However, UNCLOS in Chapter XII regulates the Protection and Preservation of the Marine Environment. Which is contained in Article 192 states that:[46] *"States have the sovereign right to exploit their natural resources pursuant to their environmental policies and in accordance with their duty to protect and preserve the marine environment".* Article 193 grants states the right to exploit their natural resources in accordance with environmental policies while protecting and preserving the marine environment.

Article 195 states "*In taking measures to prevent, reduce and control pollution of the marine environment, States shall act so as not to transfer, directly or indirectly, damage or hazards from one area to another or transform one types of pollution into another*".

In taking measures to prevent, mitigate or control the marine environment, countries should anticipate not transferring either directly or indirectly, damage or harm from one area to another. This means that Japan's

act of dumping waste into the sea could pollute the marine environment in neighboring or nearby countries.

Although Japan disposes of the waste in its own marine environment or in its territorial area, it can still be carried by currents and affect the marine environment of other countries. The Japanese government's decision to dispose of radioactive waste, which has not yet been proven not to contaminate the environment, is a problem that will affect the continuation of the marine environment internationally.

Because the characteristic of pollution is that although the impact felt at the time of pollution has not been felt, the impact can be felt in the future. Therefore, Japan must make efforts to reduce pollution that results in damage to the marine environment by carrying out the obligation of Prevention of Harm as in UNCLOS 1982 Article 194 paragraph (1) and (2) which states that:[47]

(1) *State shall take, individually or jointly as appropriate, all measures consistent with Convention that are necessary to prevent, reduce and control pollution of the*

45 https://g.co/kgs/Dp7uhGG
46 Article 193 UNCLOS 1982.
47 Article 194 paragraph (1) and (2) of UNCLOS 1982

marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities, and the shall endeavor to harmonize their policies in this connection.

(2) *States shall take all measures necessary to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution arising from incidents or activities under their jurisdiction or control does not spread beyond the areas where they exercise sovereign rights in accordance with this Convention.*

(3) Based on this article, states must take preventive measures to prevent, reduce and protect the marine environment and not cause marine pollution in the territory of other states. If Japan's actions to dispose of radioactive substance waste cause pollution to the marine environment, then the Japanese Government violates the provisions of UNCLOS 1982 because it commits transboundary pollution. The disposal of radioactive substance waste into the Pacific Ocean Sea includes activities that have an adverse impact, one of the actions to prevent this adverse impact is to carry out an EIA (Environmental Impact Assessment).[48]

EIA is a process of identifying, predicting, evaluating and mitigating relevant biophysical, social and business balancing impacts as decisions or commitments are made.[49] Conducting an EIA for activities that will have an adverse impact on the marine environment is an obligation that has been recognized as an international custom.[50]

Article 206 of UNCLOS 1982 also stipulates the obligation to conduct EIAs for activities that have the potential to pollute the marine environment. Unfortunately, there is a gap in the obligation to carry out EIAs, whereby states have discretion in determining what actions can be categorized as activities that have the potential to pollute the marine environment.[51]

In the decision made by the Government of Japan, which provides a statement that the action will not cause damage to the marine environment, so the implementation of EIA is not required. However, it should be noted that the disposal of radioactive waste has the potential to pollute the marine areas of other countries, so the Japanese Government has an obligation to carry out an EIA to determine the impact caused after the disposal of radioactive substance waste into the sea.

2) Convention on The Prevention of Marine Pollution by Dumping of Wastes and Other Matter

In Article 1 it is explained:

Contracting Parties shall individually and collectively promote the effective control of all sources of pollution of the marine environment, and pledge themselves especially to take all practicable steps to prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.

48 United Nations Human Rights Office of the High Commirssioner, *Japan: UN Experts Say Deeply Disappointed by Decision to Discharge Fukushima Water*, 2021.

49 Hardjaloka, Laura. "*International Legal Perspective on Marine Pollution originating from Land and Handling Practices in Several Countries",*Regulatory E-Journal, 2018, p. 24.

50 *Ibid,* hlm. 25.

51 *Ibid,* hlm. 54-55.

Article 1 of the Convention states that parties to the Convention shall individually and collectively promote the effective treatment of all sources of pollution of the marine environment, and undertake to take practical measures to prevent pollution of the sea by discharges of wastes and other materials which may endanger human health, natural resources and marine life. Therefore, Japan's actions in discharging radioactive waste into the sea are contrary to the obligations of the parties to the Convention.

3) The Joint Convention on The Safety of Spent Fuel Management and the Safety of Radioactive Waste Management

Article 11 stipulates that each party shall take appropriate measures to ensure that the process or stage of radioactive material management provides adequate protection to the public and the environment against radiological and other hazards. Based on the Convention above, Japan's actions to dispose of radioactive waste into the sea which caused the marine environment in the Asia Pacific region to be polluted with nuclear radiation so that it has violated the provisions of existing international law.

4) Basel Convention on The Control of Transboundary Movements of Hazardous Wastes and Their Disposal

Japan's act of dumping radioactive waste into the sea has also violated the provisions of Article 4 paragraph (7) of the Basel Convention, which states that each party shall:

(a) Prohibit all persons under its national jurisdiction from transporting or disposing of hazardous wastes or other wastes unless such persons are authorized or allowed to perform such types of operations;

(b) Require that hazardous wastes and other wastes that are to be the subject of a transboundary movement be packaged, labeled, and transported in conformity with generally accepted and recognized international rules and standards in the field of packaging, labeling, and transport, and that due account is taken of relevant internationally recognized practices;

(c) Require that hazardous wastes and other wastes be accompanied by a movement document from the point at which a transboundary movement commences to the point of disposal

However, the facts show that Japan's actions to dispose of radioactive waste in the marine environment have proven to not fulfill any of the points in the provisions of Article 4 paragraph (7) of the Basel Convention. In addition, Japan's actions are contrary to Article 9 of the Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, because it did not first notify or without the consent of countries that might be affected by the disposal of the waste.

c) Japan's Liability in the Generation of Radioactive Substances in Fukushima Waters under International Law

In international relations, the principle of state sovereignty has a very important role, where the state has full sovereignty over people, goods, and actions in the territorial area of the country and the sovereign state is not subject to other sovereign states.

In addition to the state's sovereignty over its neighbors, international law also regulates the prohibition of abusing its sovereignty, for this reason, if a state commits an act or violation against the law, it can be held accountable.

In the development of international relations between countries, there is the possibility of a country making mistakes or violations that harm other countries. When the state commits an act that harms another state, the state's responsibility automatically arises. It is necessary to know that there are several characteristics of the emergence of state responsibility, including:[52]

1) The existence of an international legal obligation that applies between two particular countries;
2) The existence of an act or omission that violates international legal obligations which gives rise to state responsibility;
3) There is damage or loss as a result of unlawful actions or negligence.

Japan's actions in disposing of radioactive waste in the marine environment have led to a number of protests and responses against Japan's actions. One of the countries that strongly protested Japan's actions was China. The Chinese government criticized by limiting the import of seafood from Japan, because it considered that Japanese seafood after the waste was disposed of was unhealthy or contaminated and could threaten the health of its citizens. Because China is also worried that radioactive waste will spread to its country's marine environment, resulting in losses for fishermen who catch seafood to meet their needs.

In addition, the National Library of Medicine or PMC (PubMed Central) website explains the legal response to Japan's disposal of radioactive waste from the perspective of China's rights protection strategy. Which explains that after the accident at the Fukushima Daiichi Nuclear Power Plant (NPP), radionuclides (such as 131I and 134Cs) from this source were detected in the atmosphere of most cities and provinces in China.[53]

In addition, China's State Oceanic Administration monitored radioactivity in the marine environment of the Western Pacific waters east of Japan three months after the Fukushima Nuclear Power Plant leak. Based on the monitoring results, radionuclides were detected in seawater samples, and 94% of the samples at monitoring stations contained 134Cs, which is not present under normal circumstances. In addition, the content of 137Cs in 71% of the monitoring stations

exceeded the background range of China's sea area, and the content of 137Cs and 90Sr was 300

and 10 times that of China's sea area background range.[54]

The risk assessment is based on the above scientific evidence to make a suitable and sufficient judgment on the consequences of discharging Fukushima nuclear wastewater, which is mostly done by professional scholars. However, when Fukushima nuclear wastewater is discharged into the sea, it will result in the following hazards: irreversible damage, safety hazards in various aspects, and worldwide consequences. The risks can be evaluated and summarized as follows:

52 Malcolm N. Shaw, *International Law,* Grotius Publication, third edition, 1991, hlm. 482.

53 Wang Lei, Zheng Guodong, Zhao Shunping, dkk.*The impact of the Fukushima nuclear accident on the environment of mainland China* (in Chinese) Radiat. Protect. 2012; 32 (6):325–335.

54 Deng Fangfang, Lin Feng, Wen Yu, et al. Distribution of 134Cs, 137Cs and 90Sr in north-west Pacific marine waters in winter 2012. Mar. Pollut. Bull. 2020; 152 (2020):1–6. [PubMed]

1) Severe damage to marine ecosystems and animal mutations; 2) Exceeding radiation levels in fishery products, fruits and vegetables, rice, and even in various segments of cosmetics; 3) Public health in all countries along the Pacific coast.[55]

Based on this description, in the context of legal relations between states or international law, the Principle of State Responsibility will be very specific. This means that the term is not simply interpreted as a state obligation but must be interpreted that state responsibility specifically indicates the juridical position after the violation of an international obligation. Which is where the state has an obligation to pay the appropriate remedy and reparation after the violation of an international legal obligation or norm.[56]

To declare that a state has violated an international obligation and caused harm to another state, two factors must be met, namely: objective and subjective elements.[57] The objective element means that the act committed by the state is a violation of the state's international obligations and this must be related to the risk of tort. While the subjective element means that the state that commits the act of violation is the subject and bearer of international obligations that meet the intention (dolus) and fault (culpa).

According to ILC(*International Law Commission*)[58] regulated in*draft State Responsibility* states that state responsibility arises when : "a conduct consisting of an action or omission is attributable to the state under international law; and the conduct constitutes a breach of an international obligation of that state".("a conduct consisting of an action or omission constitutes a fault attributable to the state under international law; and the conduct constitutes a breach of an international obligation of that state").

The ILC Draft also provides for compensation or reparation in Article 31:

1) *The responsible state is under on obligation to make full reparation for the injury caused by the international wrongful act*
2) *Injury include is any damage, whether material or moral, caused by the internationally wrongful act of a state*

The Japanese government's decision to dump radioactive waste from nuclear power plants into the Pacific Ocean is a violation of several international treaties and principles of international environmental law. This is because the actions taken by the Japanese government violate its obligations as a country that ratifies international treaties.

Moreover, if the Japanese government's decision proves to cause damage to other countries as a result of the disposal of radioactive waste, Japan can be held liable for violating the rights of other countries. Based on this fact, Japan can be

held internationally responsible for the actions or losses caused by the disposal of radioactive substance waste. Because the criteria or conditions for a state to be held responsible have been met, namely the existence of acts or omissions that violate obligationsininternationallaw.Therefore,theactionstakenbytheJapaneseGovernment have violated the provisions and are considered wrong under international law.

55 Qi Yuanbo, You Keke, Guo Shanshan.*The battle for public opinion about Japan's "nuclear wastewater discharge*". Open J. Polit. Sci. 2022; 12 :363–372.
56 Sukanda Husin,*Op, Cit.*Hlm. 166.
57 Sukanda Husin,*Ibid.* Hlm. 167.
58 The ILC is one of the UN organs which has the task of formulating and discussing international provisions and law.

2. Role International Atomic Energy Agency or the IAEA in resolving the case of the manufacture of radioactive substances in Fukushima waters by Japan

The International Atomic Energy Agency (IAEA) is an international organization functionally under the auspices of the UN Security Council that aims to supervise the use of nuclear energy while promoting nuclear technology for peaceful purposes. As an international organization, the IAEA has a legal basis as a reference contained in the IAEA Statute and the Non Proliferation Treaty (NPT).

The IAEA Statute establishes three pillars in carrying out its functions consisting of Safety and Security, Science and Technology, and Safeguards and Verification. To achieve these three pillars, the IAEA has the task of conducting inspections of member states' nuclear energy facilities, establishing certain provisions and standards to ensure the nuclear energy facilities of all member states, and acting as a network center for scientists in seeking and applying nuclear technology for peaceful purposes.[59]

In carrying out its duties, the IAEA prioritizes aspects of state sovereignty, so that if there is a member state that violates the regulations set by the IAEA, the IAEA has the right to submit a violation report to the UN Security Council. But in this case, the IAEA does not have the authority to impose legal sanctions on the member state, but only provides assistance or assistance in resolving issues related to nuclear energy in accordance with the agreement of the country concerned.

Japan certainly has rights and obligations as a member state of the IAEA, which Japan believes asks for assistance to the IAEA in resolving issues related to nuclear waste at the Fukushima nuclear power plant due to the 2011 natural disaster. Previously Japan had also asked for IAEA assistance in investigating the cause of the nuclear reactor accident at the Fukushima Daiichi NPP, where the IAEA formed an Investigation Team called International Fact Finding which has the task of conducting investigations and obtaining facts that can be used as a basis for formulating a solution in dealing with the nuclear waste problem.

The members of the International Fact Finding team consisted of experts in nuclear and technology. And found several causes such as, regulation of nuclear power plant construction, improper diesel research, and anticipation of external hazards that were ignored by the Japanese government.[60] After making a decision in April 2021 to dispose of radioactive waste stored at the Fukushima Daiichi nuclear power plant (FDNPS) into the sea, Japan asked the IAEA to supervise the safety aspects of the disposal plan.

The IAEA STATUTA describes safety requirements for radioactive waste disposal planning, protection of the public and the environment, requirements for the construction, operation, and closure of disposal facilities and health insurance. In addition, the IAEA safety standards regulate the classification of radioactive waste, namely, low-level waste (LLW), intermediate-level waste (ILW), and high-level waste (HLW).

The radioactive substance waste disposed of by Japan is classified as Intermediate Level Waste (ILW), which is defined as waste containing long-lived

59 http://www.iaea.org/About/statute.html

60 Aprilia Mawaddah,*Legal Analysis of the Plan to Dispose of Nuclear Waste into the Sea After the Earthquake and Tsunami Occurred in Japan*, Riau University, 2 June 2023. p.9.

radionuclides in quantities that require a greater degree of containment and isolation from the biosphere than those generated through near-surface disposal.

To help Japan solve the problem related to the disposal of radioactive substance waste, the IAEA formed a task force team where this team helped the Japanese Government to formulate a solution in dealing with the radioactive substance waste problem. The IAEA Task Force in its work has three main components, namely protection and safety assessments, regulatory activities and processes and independent sampling of data evidence, and analysis.

In addition, the IAEA Task Force also monitors radioactive substance waste prior to disposal to review the extent to which the waste is treated using ALPS techniques in accordance with established international safety standards. In its mission, the IAEA Task Force cooperated with the Government of Japan, TEPCO, the Japanese Ministry of Economy, Trade and Industry (METI) and the Nuclear Regulatory Authority (NRA) to jointly review and supervise all facilities and equipment during the treatment process of radioactive substance waste before it is ready to be discharged into the sea.

The IAEA Task Force has established safety standards for radioactive substance waste disposal. IAEA safety standard No. SSG-29 governs the management of radioactive substance waste, including the disposal of radioactive substance waste at sea. This standard sets out requirements to ensure that radioactive substance waste disposal is carried out safely and does not endanger human health and the environment. Some of the requirements that must be met in radioactive substance waste disposal include: radiation measurement and monitoring, radioactive substance waste treatment, and supervision of the release of radioactive substance waste into the marine environment.

In its observations, the Task Force found that the disposal of the radioactive substance waste has been consistent with international safety standards since the first water release.[61] So far, the Japanese government has completed the release of three waves with a total of 23,400 cubic meters of water.[62] IAEA Director-General Rafael Mariono Grossi said that before the radioactive waste is actually discharged into the sea, we have been conducting observations since 2021 to review the faith of the waste in the tank in accordance with international standards in an effort to protect people and the environment from the harmful effects of radiation.[63]

The IAEA Task Force recently issued a report on the follow-up to the faith review of radioactive substance waste disposal that describes the latest findings from the data substantiation as the basis for Japan's plan to dispose of radioactive substance waste treated using the ALPS technique.[64] The water stored in the FDN PS that was treated through ALPS, and leaving only tritium, before disposal, the Japanese state will derail the waste so that the tritium is below the regulatory standard.

This is evidenced by the IAEA conducting a series of inter-laboratory comparisons (ILCs) to corroborate source and impact monitoring for the marine environment. During the laboratory testing process, it was found that the ILC assessed TEPCO as having the

61 https://lk2fhui.law.ui.ac.id/portfolio/fenomena-pembuangan-limbah-nuklir-fukushima- sebuah-analisis-dalam-perspektif-hukum-internasional/

62 *Ibid,* hlm.8.

63 https://www.cnbcindonesia.com/research/20230828065547-128-466542/dampak-limbah- nuklir-fukushima-ikan-dari-jepang-aman

64 https://journal.uny.ac.id/index.php/cp/article/view/8967/pdf

ability to accurately and precisely measure radionuclides present in the treated water stored at the site. The second fact was that the IAEA obtained comparative results of radionuclide analysis of seawater, seawater, fish, and seaweed samples prior to the commencement of radioactive substance waste disposal at sea. This was done to improve observations intended to

establish a baseline of activity concentrations in the marine environment that can be used to measure future impacts.

In a report formally presented by the IAEA Director General to Japanese Prime Minister Fumio Kishida, who conveyed the results of two years of work conducted by the Task Force and international nuclear safety experts from 11 countries. They reviewed Japan's plans for the IAEA Safety Standards that serve as a global reference for protecting people and the environment and contribute to the harmonization of high safety levels around the world.

IAEA Director General Gross Ii is committed to engaging before, during and after water discharge. Evidently over the past two years the IAEA Task Force has conducted five review missions to Japan, issuing six technical reports with the assistance of the Government of Japan and TEPCO, the operator of FDNPS to analyze monitoring and regulatory results. In addition, Task Force members also visited sites in eastern Japan several times to review preparations for the release of radioactive substance waste.

In its report, the IAEA will continue to provide transparency to the international community or all stakeholders to allow all stakeholders to rely on verified facts and science to inform their understanding of the issue throughout the process. The IAEA safety review will continue during the decommissioning phase, the IAEA Task Force will also continue to directly monitor the dislocation and provide online monitoring via the website. To guarantee and ensure international safety standards that must be applied throughout the radioactive substance waste disposal process.

To date, there is no information that mentions any concrete findings regarding the impact of losses due to the disposal of nuclear waste from Fukushima Daiichi. However, Japan's decision to discharge wastewater into the ocean has raised concerns and concerns from various parties, including neighboring countries and the international community. Some are concerned about the impact on marine ecosystems, human health, and the fishing industry, while others assert that the disposal of nuclear waste is safe. The controversy continues, and the issue is still being debated at the international level.

D. CONCLUSION

From the discussion in the previous chapter IV, the author concludes:

1. The actions taken by the Government of Japan by disposing of radioactive waste in the marine environment of the Asia Pacific region have violated several provisions in the field of international law, namely, the principles of international environmental law, and international conventions such as, UNCLOS 1982, Paris Convention, Nuclear Safety Convention. So that the Japanese state has the responsibility to compensate both materially and immaterially to the affected countries. As for international law,

namely in the Draft Articles on State Responsibility, it regulates state responsibility, namely, restitution, compensation, satisfaction.

2. The IAEA (International Atomic Energy Agency) Task Force has determined that the radioactive substance waste disposed of by Japan meets IAEA safety standards, and is classified as intermediate-level waste according to the IAEA Classification of Radioactive Waste No. GSG-1. In addition, Japan's disposal of radioactive waste is regulated by IAEA Safety Standard No. SSG-29 on the control of radioactive releases to the environment.

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