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The Illegality of Relative Subjects' Actions in the Fukushima Daiichi Nuclear Disaster

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Abstract: A 9.0-magnitude earthquake and subsequent 14-meter tsunami occurred in March 2011 in the Northeast Pacific Ocean off the coast of Japan. The Fukushima I Nuclear Power Plant located along the coast was attacked by the tsunami and suffered a nuclear leakage accident, which is called the Fukushima Daiichi Nuclear Disaster. The damage caused by the accident not only affected the local area, but also spread to surrounding nations and regions. This study mainly focuses on the actions of the Japanese government and the Tokyo Electric Power Company in the disaster, and uses literature research method. Information related to the Fukushima Daiichi Nuclear Disaster and relevant conventions have been collected and analyzed. By means of searching, categorizing and comparing the research and study of different scholars, institutions and organizations, the paper collated and analyzed the inappropriate and even illegal behaviors of the Relative Subjects mentioned in the case, and came to a conclusion that these behaviors have violated the Convention on Nuclear Safety, the Convention on Early Notification of a Nuclear Accident and the United Nations Convention on the Law of the Sea.

Keywords: Fukushima Daiichi Nuclear Disaster, nuclear safety, illegality, Japan

1. Introduction

On March 11, 2011, an earthquake measuring 9.0 on the Richter Scale, also known as the 2011 earthquake of the Pacific coast of Tohoku, struck the Northeast Pacific Ocean of Japan and caused a tsunami, of which the highest height reached 14 meters. It hit the Fukushima I Nuclear Power Plant (hereinafter referred to as "the Power Plant") along the coast, leading to severe nuclear leakage [1]. The leakage is called the Fukushima Daiichi Nuclear Disaster (hereinafter referred to as "the Nuclear Disaster in Japan"), and the level of it is considered as the highest level 7 (major accident) on the International Nuclear and Radiological Event Scale, as same as the Chernobyl Nuclear Accident [2].

Attributed to it, the emergency core cooling system of the Power Plant broke down and with the aim of preventing it from melting by heat, a daily 400 tons of water must be poured into it. The water flowing out of the core was polluted by a large number of radioactive elements in the emergency core, meaning that the water is polluted with radioactive substances such as Tritium, 60Co, 137Cs, 90Sr, and 14C [3]. Therefore, the water mentioned is nuclear wastewater. The Japanese government has proposed five methods on the disposal of the nuclear wastewater

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generated in the Nuclear Disaster in Japan, including injection into the ground, discharge into the ocean, water vapour heating emission, release to the atmosphere after electrolysis, and underground burial [4]. On a cabinet meeting held by the Japanese government (hereinafter referred to as "the Government") in 2021, a decision to adopt the second treatment, which is to discharge Fukushima nuclear wastewater (hereinafter referred to as "the Wastewater") into the Pacific Ocean in 2023 was made, on account of its lowest cost among the five measures mentioned above [5]. However, it is not an internationally accepted treatment. If the nuclear wastewater produced in the Fukushima disaster is poured into the ocean, human health will be seriously threatened by the radioactive element in the wastewater discharged.

Concerning with the full case, many scholars and organizations in different fields in China and other countries performed research from different perspectives. Hideyuki Kawamura, the corresponding author of Sector of Nuclear Science Research, Japan Atomic Energy Agency, stated in the 2013 model simulation of the extent to which the concentration of element Cs in the Northeast Pacific from the Nuclear Disaster in Japan has spread over time, that the concentration of radioactive element Cesium would be diluted by ocean currents and mesoscale eddies to the level before the accident 2.5 years after the disaster [6].

On the contrary, the German marine institution Helmholtz Centre for Ocean Research Kiel conducted a model simulation in 2012 of the extent to which the radioactive element 137Cs has diffused over time, stating that after the discharge of the Wastewater, the radioactive element cesium can reach the coastal waters of China in 240 days, and will spread to the North American coast after 1200 days, almost covering the entire North Pacific [7].

The learned periodical led by Peng Dingdai, a Chinese PhD of Law, pointed out that the actions taken by the Government and the Tokyo Electric Power Company (hereinafter referred to as "the Power Company") before, during and after this accident were inappropriate and even illegal, and indicates that these behaviors violated the Convention on Early Notification of a Nuclear Accident (hereinafter referred to as "the Convention on Notification") and the United Nations Convention on the Law of the Sea (hereinafter referred to as "the Convention of the Sea") [8].

2. The Government and the Power Company's Misconduct in Handling the Nuclear Disaster in Japan

2.1. Prior to the Accident

2.1.1. Flaws in the Design of the Power Plant

On March 22, 2011, Haruki Madarame, the former chairman of Nuclear Safety Commission of Japan, acknowledged and apologized in public that there were flaws in the design of the Power Plant. He also admitted that the contingency plan was inadequate that there was a lack of consideration under the circumstance that a number of significant machines broke down at the same time [8].

2.1.2. Aging of the Machine

In Japan, a nuclear power generating unit that has been in operation for 30 years is dubbed as an unit "of advanced age", which means that the unit has been running for quite a long time, exceeding its normal operating life. However, in the March of 2011 when the tsunami attacked the Power Plant, the first unit of the Power Plant had been running for over 40 years, 10 years beyond the advanced age life span, being to blame for the subsequent nuclear accident [9].

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2.1.3. Unsystematic and Unscientific Contingency Plan

As early as 2004, it had become matters of international concern that several countries in Sumatra Island, Indonesia around the Indian Ocean have been affected by an earthquake and tsunamis caused the earthquake and a nuclear power plant was flooded by the tsunamis. Then, the awareness of the security of the Fukushima Power Plant had been bolstered. Thus, an analysis of probabilistic tsunami Hazard had been being conducted by Toshiaki Sakai, an engineer in the Tokyo Electric Power Company, and his team and the analysis was completed in 2006. The analysis indicated that the probability of the nuclear power plant encountering waves higher than 6 meters was about 10% within 50 years, while the nuclear power plant could only withstand waves under 6 meters height. It was also pointed out that "due to the uncertainty of the tsunami phenomenon, there was a possibility that the height of the wave caused by tsunami exceeded the height of (the nuclear power plant) design for protection" [10].

Despite these risks, Sakae Muto, the former president of the Power Company, stated that "Experts have not reached a agreement on the conclusion" and the company did not make any improvement according to the analysis. Unexpectedly, the height of the waves that attacked the power plant in March 2011 reached 14 meters, more than double the designed height [8, 11].

2.2. Posterior to the Accident

2.2.1. Blocking Information and Refusal to Domestic and International Assistance

There were two crises in the Fukushima Daiichi Nuclear Disaster that were widely considered as crucial turning points that could reduce the damage caused by the accident as much as possible if appropriate actions were taken: one was the electricity outage of the nuclear power unit after the earthquake, while the cooling system of the plant could not operate properly, and the other node was the unexpected hydrogen explosion at the unit I plant on the second day after the tsunami occurred [9].

However, the Tokyo Electric Power Company and Japanese government had too much confidence in their ability to deal with accidents and did not want to cause mass panic among the local residents. At the two key nodes mentioned above, they not only not released the actual condition of the disaster and ordered citizens to evacuate without telling them why, but also rejected emergency plans from professional and technical domestic personnel who were familiar with the structure of the nuclear power plants, and international aid from America, resulting in missing the opportunities of minimizing the scope of the disaster influenced and losses again and again [11]. Thus, damage caused by the nuclear disaster directly and indirectly was too enormous to imagine or calculate.

2.2.2. Unauthorised Discharge of the Wastewater into the Pacific Ocean Without Conferring with Relevant Nations and Regions

From April 4th to 10th, 2011, without international consultation with surrounding countries and regions that would be affected by ocean currents and mesoscale eddies that contains harmful radioactive elements if the nuclear wastewater was discharged into ocean in advance, the Tokyo Electric Power Company emitted more than 10, 000 tons of the Wastewater into the sea, putting stress on the necessity of making room for storing nuclear wastewater with higher radioactivity comparing to those which had been emitted [12]. This has attracted widespread concerns domestically and internationally.

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3. Illegality of Actions Taken by the Government and the Power Company

3.1. Violation of the Nuclear Safety Convention

The Nuclear Safety Convention (hereinafter referred to as "the Safety Convention") is the most important and fundamental convention in the international nuclear safety treaty framework. It was adopted by a diplomatic conference in Vienna on June 17, 1994 and has been in force since October 24, 1996. Japan is one of the Contracting States to the Safety Convention [13].

Before the accident happened, risks have emerged and were found out, such as defective design of the nuclear power plants, aging of machines, and inadequate contingency plan when an emergency occurs. However, the Government and the Power Company turned a blind eye to it, in spite of the fact that these problems could cause extremely severe nuclear damage. In a legal sense, the actions taken by them violated the regulations of the Safety Convention, which specified that Contracting States ought to guarantee emergency plans on and off site for nuclear facilities, and the principle that State Parties ought to guarantee the safety of nuclear facilities [14].

3.2. Violation of the Convention on Notification

The Convention on Notification was adopted 5 months after the Accident at the Chernobyl Nuclear Power Plant (as mentioned at the Introduction Part of this paper, the Chernobyl Accident is the first nuclear accident that is graded as the highest level 7, and the Fukushima Daiichi Nuclear Disaster is the second one) and went into effect the next day in 1986 [15].

The convention has set up a Notification System for nuclear accidents in which a radioactive material discharge happens or is likely to happen, and which has led to or might lead to a discharge across the nation boundary that may be of great significance to the other nation in their radiological safety [16,17]. In order to analyse the situation mentioned as accurately as possible, contracting state must report the time, place, type, and other information and details necessary and timely updates on the latest information of the accident according to the convention [18]. Also, it is required to inform the details immediately to both the the International Atomic Energy Agency (hereinafter referred to as "IAEA") and the other States affected, either directly or via the IAEA [19].

In order to determine whether the convention is applicable to the emission of the Wastewater into the ocean, the following two criteria should be based on. The first is, whether the action of discharge is directly implemented by or be of the control of the contracting party; The second is whether the action itself has the potential infringement to the radiation safety of other countries [20]. Fukushima nuclear wastewater has obviously been contaminated with radioactive substances from the reactor, which certainly poses a radiation hazard to surrounding countries, or even worse, to the globe. Therefore, whether the convention is applicable depends on whether the discharge of the Wastewater into the sea can be recognized as a national behaviour.

According to traditional international law, only the actions of State organs and staff members of them can be attributed to the state, but this changed when the United Nations International Law Commission's Draft Articles, the Responsibility of States for Internationally Wrongful Acts enriched the definition of range of state behavior in 2001 [21]. According to the Draft Articles on State Responsibility, the act of an institution shall be deemed as an act of the state if it is implemented after being approved by the government of a country in accordance with its domestic law [22]. Although the actual executor of the plan of emitting the Wastewater into the Pacific Ocean is the Power Company, the discharge of the Wastewater by the Power Company requires the approval of the Government. Therefore, the discharge according to the Draft Articles should be

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considered as an action of Japan and the discharge of the Wastewater should fall within the scope of application of the Notification Convention in terms of procedures.

However, after the Fukushima Daiichi Nuclear Disaster happened, faced with domestic assistance and international aid, the Government and the Power Company chose the path to block the information about the accident and did not provide necessary details to the IAEA and relevant surrounding countries in a timely manner. Actions mentioned violate the Convention on Notification.

3.3. Violation of the Convention of the Sea

The need for a new, widely regarded convention on the law of the sea had been brought into focus by a number of developments that have taken place since 1958 and 1960. As a result, the United Nations Convention on the Law of the Sea was established and has come into force since on November 16, 1994. It has provided a set of guidelines for controlling all uses of the oceans' resources and a complete legal and order system for the world's oceans. The Convention includes the belief that all concerns pertaining to ocean space are interconnected and should be dealt with as a whole [23].

The regulations and duties that contracting parties have to follow to in order to prevent any harm to the marine environment and make sure that there is a sustainable development of it, are outlined in the Convention's twelfth part. The general obligation is to protect and preserve the marine environment [24].

3.3.1. The Obligation of Preventing Pollution from the Ocean

The Convention of the Sea specifies that the countries that have signed this convention shall take all efforts to prevent, minimize, and manage marine environmental pollution from any source individually or with other parties appropriately. In addition, All necessary measures should be taken by the states to ensure that the pollution or risks brought about by incidents or actions within their jurisdiction or control do not spread outside the boundaries of the areas in which the states exercise sovereign rights [25].

Japan is one of the contracting states to this convention. The marine pollution is produced from the one-week emission of the nuclear wastewater produced in the Fukushima nuclear accident that has radioactive element in April 2011. The pollution fell under the term "pollution from any source". It can be seen that the discharge event of the Wastewater at Fukushima is within the scope of the Convention of the Sea and violated the obligation of preventing pollution from the ocean under the convention [26].

3.3.2. The Obligation of Notification and Negotiation

As stated by Article 198 of the Convention of the Sea, the Japanese government has the obligation to inform other countries and competent international organizations that may be affected by imminent danger of the hazards and pollution caused by the Nuclear Disaster in Japan in a timely and accurate manner [27]. According to Article 200, the Government shall notify with other contracting parties of the convention and share acquired information and data concerning pollution of the marine environment [28]. Thus, when the the Power Plant exploded and the accident happened Japanese government was obliged to inform relevant countries of the details of the accident immediately and keeps on updating the details of the marine environment until the influence of the accident is reduce to the situation before it occurs. Also, the government was obligated to fully communicate and negotiate with neighboring countries such as China and South Korea before dumping nuclear wastewater into the ocean in April 2011.

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In fact, the Government and the Power Company not only blocked relevant information during the nuclear accident, but also did not report and consult with countries which are surrounding by Japan and which are affected by the accident or the emission in April, 2011, on this matter in the 10 years after the Fukushima nuclear accident, except for the report submitted to the IAEA [20]. The above behaviors violated the obligation of notification and negotiation as provided for in the Convention of the Sea.

4. Conclusions

This study collated and analyze the inappropriate actions taken by the Japanese government and the Tokyo Electric Power Company before, during and after the Fukushima Nuclear Disaster. The behaviors are sorted into two parts. The first part includes not taking necessary improvement when there were flaws in the design of nuclear plants, the plants themselves were so old that exceed the "advanced age", and emergency plans are inadequate. In the second part, there are three actions taken by the Relative Subjects mentioned above that were studied in this research, which are blocking the information, refusing domestic and international assistance, lack of reporting situation of the accident in a time manner, missing two crises that could minimize damage effectively, and dumping nuclear wastewater without conferring.

As one of the contracting Countries to a series of Conventions, including the 1982 United Nations Convention on the Law of the Sea, the 1994 Convention on Nuclear Safety, and the 1986 Convention on Early Notification of a Nuclear Accident, Japan has violated the relevant provisions of them.

Nowadays, nuclear safety remains an significant factor that must be ensured in global energy development. How to use nuclear energy efficiently and safely is a topic that scientists still work hard to explore. When facing accidents that have already occurred and cannot be reversed, the most important thing is to rethink profoundly and summarize the lessons which have been learnt for human and maintain a green and sustainable nuclear development.

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