Lawrence Liang Pui Man 19072352D ENG3004 Assignment 1

Q3: Analyze the impact of Fukushima’s wastewater to the environment, the social perception of the company/country. What are the alternatives?

On 11 March 2011, a terrible earthquake happened in Okuma. During the earthquake, the nuclear station units 1-3 were operating and they stopped the sustained fission reactions followed by the safety measurements. Since the electricity was shutted down and the reactors were unable to run the coolant systems, the emergency diesel has been used for providing power. However, the tsunami followed by the earthquake was around 13 to 14 meters, which is way higher than the average sea level for at least 10 meters. The impact of the tsunami was huge and the wave also flooded the whole basements. All the emergency diesel generators were unable to provide the power anymore. Since the power had shutted down, the furnace core emergency cooling system would have failed [1]. The seawater cooling system was also damaged by the tsunami. The failure of the two cooling systems results in the decay heat becoming overheating. The overheating of the decay heat will increase the pressure inside the tank because the fuel particle cladding will react with water and produce hydrogen. As to prevent the over pressure, which also means explosion, the pressure needs to be reduced. Compared with releasing the hydrogen into air, wet venting can release less amount of the radioactive substances. The water with substances were released to the pacific ocean claimed by the Tokyo Electric Power Company Holdings after 28 months. However, the company has chosen the wrong way to deal with the wastewater that brings a huge impact to the environment and the society.

The disposal of radioactive sewage into the ocean would influence the soil and the water. After the soil and water have been affected, the crop and marine life would absorb the radiation. Research has shown that 18 water-purification plants in Tokyo have detected radioactive iodine-131 exceeding the safety limits of babies [2]. When humans eat the affected crop and seafood, the radiation will be absorbed and it will harm the human organs. Scientists believed that absorbing too much radiation into human bodies could increase the chance of getting cancer and the pregnant woman could lose the fetus or birth to abnormal babies. Radiation would also affect the living of the plant and marine life instead of only humans. After the wastewater was disposed of to the ocean, the soil may absorb the radioactive water since they need to provide water to the plant. When the plant draws wastewater from the soil, it would reduce the life of the plant or even cause plants to mutate. The same reason can also apply to marine life, after they have absorbed the radiation, their life may be reduced. Some marine life could also die or become extinct due to the excess radiation. It would destroy the biodiversity and the food chain of the animal. If one of the layers of the food chain has been broken, it can totally affect the whole food chain. The higher layer food chain life may also become extinct due to the extinction of the low layer life because they cannot find the food to eat. In this case, it will bring an irreversible change and break the sustainability of the environment.

Apart from the environment, disposal of the wastewater will also bring impact the social perception of the company. The company of the nuclear power station is the Tokyo Electric Power Company (TEPCO). As mentioned above, they used wet venting to prevent the explosion of the tank. In the beginning, the company did not tell the general public about the method to deal with the polluted water. The public thought the wastewater was disposed of in the ocean but the company did not make any response. After 28 months, the company finally admitted that they disposed of it in the ocean. Although the company was not necessary to reply to all the public opinion, the company should be able to tell the public how they deal with the water. In terms of social responsibility, the company should always let the people know since it will be harmful to the citizens’ health. Even though TEPCO had made remedies to stop the wastewater spread, the company image still cannot be saved. With the concealment of the company, the other stakeholder will find it much harder to stop the spread of the water also with the irreversible impact [3].

The social perception of Japan is also affected by the TEPCO. Since the wastewater was disposed of into the pacific ocean, the water can drift to other countries. The judgment of 17 June 2022 from the Supreme Court of Japan shows that the government of Japan does not have the responsibility of compensation for the whole accident [4]. Although the judgment shows that the government of Japan does not have the responsibility, the government should always monitor the actions of TEPCO. From the other countries’ perspective, TPECO is still representing Japan which means Japan also needs to take responsibility for this.

For the alternatives to the disposal of radioactive sewage, there are several opinions like vapor release, hydrogen release, subsurface burial and geosphere injection. However, different opinions may provide other factors and concerns like the duration, cost, pollutants, the effect on the staff, etc. If the company really finds that this is the only possible solution to solving the wastewater, the company can also try to reduce the radiation content of the water to reduce the impact caused by the sewage.

To sum up, the content above, although this is an accident that no one wants to happen, the company and the countries are responsible for the situation. If the company had thought of the result of the disposal of the sewage, it would reduce or even prevent the irreversible impact that made on the environment.

**reference**

1. Nuclear Emergency Response Headquarters Government of Japan, “Report of the Japanese Government to the IAEA Ministerial Conference on Nuclear Safety.” [Online]. Available: https://web.archive.org/web/20210413000316/https://japan.kantei.go.jp/kan/topics/201106/iaea\_houkokusho\_e.html. [Accessed: 17-Feb-2023].
2. M. Winter, “Report: Emissions from Japan Plant Approach Chernobyl Levels,” *USATODAY.COM*, 24-Mar-2011. [Online]. Available: https://web.archive.org/web/20130818115231/http://content.usatoday.com/communities/ondeadline/post/2011/03/report-radioactive-emissions-from-japan-plant-approach-chernobyl-levels/1. [Accessed: 17-Feb-2023].
3. T. Otake, “In first, TEPCO admits ice wall can't stop fukushima no. 1 groundwater,” *The Japan Times*. [Online]. Available: https://web.archive.org/web/20201129070537/https://www.japantimes.co.jp/news/2016/07/20/national/first-tepco-admits-ice-wall-cant-stop-fukushima-no-1-groundwater/. [Accessed: 17-Feb-2023].
4. 日テレNEWS, “福島第一原発事故集団訴訟　最高裁が国の責任認めず‘適切な措置でも事故発生の可能性高い’（日テレNEWS）,” Yahoo!ニュース, 17-Jun-2022. [Online]. Available: https://news.yahoo.co.jp/articles/6ee45d58de1b6f52234372c4d269f14035fa4656. [Accessed: 17-Feb-2023].