

STEPS Students Report

Masahiro Araki (B3)
Department of Civil Engineering

On March 12th, 2011, the Unit 1 of the Fukushima 1st nuclear power plant made a hydrogen explosion, and the Unit 3 and 4 also exploded similarly on the following days. About 25 years before this accident, on April 26th, 1986, the Unit 4 of the Chernobyl nuclear power plant is said to have caused a nuclear explosion. To wish to prevent future expected disasters, I wanted to compare these two disasters in terms of the accidental causes. That is why I decided to study in Russia under Professor Gennady Belozerskiy, a scientist who has made research on the Chernobyl accident and other nuclear disasters in Russia.

On the first day of my stay, however, he told me "Each accident is unique and it's impossible to compare." While getting basic knowledge of nuclear power plant, radioactivity and two accidents under him, I began to understand that there are two main reasons why he said so. First is the difference between engineering and science. I belong to the Department of Civil Engineering, and there we sometimes analyze qualitative factors such as stakeholders' relations and causal relationships. On the other hand, the Professor is a genuine scientist who use only qualitative parameters such as radioactivity data. It was interesting for me to know how seriously scientists demand a basis and accuracy. Second is the social difference surrounding the nuclear industry between Russia and Japan. In Japan, a lot of data such as radioactivity survey data and researches on the accidental causes are relatively open. On the other hand, in Russia such data and information are so limited that we cannot access to those. For example, Pravda, official newspapers of the Soviet Union, first announced the Chernobyl accident on April 30th, 4 days after the disaster, and then they said "There was an accident, but it's not serious and under control." Needless to say, we cannot say for sure which situation is better. For example, the Japanese governments and electricity companies also tend to hide the profound information, and in Russia, there are so many small NGOs from scientists and specialists, which try to improve secretive conditions. The situations are totally different from country to country.

After getting basic knowledge, to investigate the Fukushima accident, I tried to compare the radioactivity survey data of the government and that of the Green NGOs such as CNIC (Citizens' Nuclear Information Center) or CRMS (Citizens' Radioactivity Measuring Stations). This research is based on the question that the government and TEPCO may hide the correct data in order to conceal what really happened and their responsibility for that. (We hypothesized that there are three methods to hide the truth: 1. To keep information

secret completely, 2. Open a changed data, 3. Open almost all useless data and hide only critical data.) As far as I gathered, there is no clear difference on radioactivity survey data. However, while doing this works, I could realize that there are very limited numbers of data in early days after the accident, and that each organization use so different data format that it becomes useless in reality. I did other researches, for example, on long-term radioactivity survey in Japan or on the impact of the Tokaimura accident, but I could not do useful analysis at all.

In addition to the research, I get personal lectures from the Professor on the following two topics. First was on the history of nuclear accidents in Russia. In Japan, we usually focus only on the Chernobyl accident, but a lot of other accidents and radioactive pollution had happened before that. For example, Kyshtym disaster, which happened in 1957 at Mayak, had been concealed until 1989, and the government has done nothing on radioactive contamination of the Techa River from 1948. As the result of these, people continued to live there suffering health problems. At the nuclear power plants near St. Petersburg in 1975 and near Vladivostok on December, 1985 (only 5 months before the Chernobyl accident), some small accidents happened whose causes were almost same as the Chernobyl accident. However, since those were kept secret and no measures that learned lessons from the accidents were taken, they could not prevent the disaster.

Second is on how the investigation into the causes has been done. It is very important to clarify the causes and the results in order to prevent possible accidents and to take appropriate responses. To my surprise, however, no enough investigation has been taken until now due to a combination of participants' intentions. For example, in first report in 1986 published by INSAG: the International Nuclear Safety Advisory Group, they put the total onus on the operators who worked at that day, and they said there were no fault in the structure of the reactor. However, in seventh report in 1992, it turned slightly to admit the fault of the reactor. As other examples, Mr. Konstantin Checherov, the Russian scientist, opposed to the official report in the points of the cause of explosion and the amount of the emitted radioactive substances, but the government has not admitted this claim. I found at last that there is no clear conclusion, although 30 years have passed since the disaster occurred,

The professor repeatedly said to me "If you are really eager to know the nuclear accidents, you should learn the reactor engineering and the nuclear science for more than 2 years at the set out."