

Provisional Transcript of the Briefing on Health Effects of Disaster-affected Fukushima Daiichi Nuclear Power Station by Dr. Keiichi Nakagawa, Associate Professor, Department of Radiology at the University of Tokyo Hospital (March 16, 2011)

FPCJ

Good evening, ladies and gentlemen. Thank you very much for waiting.

We have from University of Tokyo Hospital Dr. Keiichi Nakagawa, the associate professor from the Department of Radiology. For the Fukushima Number 1 Nuclear Power Station accident, the health effects from the accident will be explained by Dr. Nakagawa. Dr. Nakagawa has other appointments, and he has to leave at 8 o'clock. And I would like to ask your indulgence. As for his CV, I will be skipping the explanations. Please refer to your handout. Now if I can ask you, as is the usual practice, if you could please switch your cell phones to silent mode, please. We have simultaneous interpretation service today. We have from Simul International Miss Nishimura as well as Miss Ono, the two interpreters. And as is indicated at the front of the room, Japanese is on channel 1 and English is on channel 2. Dr. Nakagawa, please.

Dr. Nakagawa

Good evening, ladies and gentlemen. Is the microphone working? Thank you for the kind introduction. Can you hear me? My name is Nakagawa from University of Tokyo Hospital. For the Fukushima Dai-ichi Nuclear Power Station accident, this was indeed a major accident, but what may be the impact to be felt by the general public? We need to be calm and level-headed in trying to understand what is happening. I don't think there is many opportunities for having such briefings. IAEA, the International Atomic Energy Agency, on the incidents to do with radiology, the seriousness of the radiology incidents have been classified. Seven for the Chernobyl incident; and for Three Mile Island incident, 5. These were the classifications. And JOC's the accident several years ago, level 4 was given. So JCO's incident that happened was a very sloppy operation, that it had a very primitive way and mode of operation in trying to handle the uranium using funnels. So that was the accident that happened several years ago. There were two deaths of the workers, and they passed away at the University of Tokyo Hospital. And I had the experience of treating those two fatal patients.

Now the accident that happened this time as compared to the Three Mile Island accident, there is a similarity between the two. So at this moment in time it is similar to the Three Mile Island incident. But there is a difference. The difference is the number of reactors is quite many. There are six reactors in the Fukushima Dai-ichi Nuclear Power Station. So in terms of volume it may be bigger, but in terms of its essential nature of the incident if you compare with Chernobyl and also the Three Mile Island incident and the Fukushima accident, what may be the difference for the three?

I was told to have this briefing just this morning. So I don't have much material that I gathered. But if you look at the structure of the nuclear power station, you have the buildings and then you have the container, the

containment vessels which are made of iron, the huge vessel. And there is the compression vessel, the pressure vessel, and you have a rod core, the reactor core. But at this moment in time, the containment vessel is almost not being impaired, which is quite different from Three Mile Island or Chernobyl. For the Chernobyl incident, the containment vessel itself has been destroyed. So the reactor core was exposed, and you would be able to see the core from above. So the radioactive material will leak freely. That was the case of the Chernobyl incident. But right now for the Fukushima accident, although there is some linkage, it is not in a major scale if you compare with the Chernobyl incident.

Now having said all of these, what may be the effect on the human body, on human beings? I would like to divide into three factors. Roughly speaking it would be two factors, but if you go more into technical detail, there will be three different factors. First of all, the person who would be exposed, the victims would be the workers of Tokyo Electric Power, or TEPCO, those especially trained workers who are able to be qualified to handle the radioactive materials, those workers at the nuclear power stations in a time of emergency like this, 100 millisieverts, up until that limits they will be allowed to be exposed. That is to say, that is the maximum limit. Sievert is a unit which is often discussed, and perhaps I need to explain. Sievert as a unit is when a radioactive effect is felt by the human body 1/1,000 is a millisieverts, that is to say 1/1,000,000 is one microsievert.

Now, for the operators the maximum allowable limit I mentioned earlier is his 100 millisieverts. Now then what about us? Now we often use the word being exposed or not being exposed. This is nonsensical as a terminology. There is nobody who will not be exposed at all. Everyone is exposed. All of you in this room are also exposed because there are radiology coming from outer space and also in the air like radon, which is always contained in the atmosphere. And also from the earth and ground there is always radiation. And in your food that you eat there is radioactive potassium which is also a kind of radiation. So you are eating on a daily basis such radiation. So the radiation that happens in nature is 2.4 millisieverts, which is 2400 microsieverts. Of course, it differs from locality to locality. For instance, in Iran, I forgot in a certain district, in Iran it was close to 10 millisieverts. It is more than four times the average for the whole world. So depending on the location or the country it varies. Close to the mines the level would be higher. And when there is a higher altitude, of course you are closer to outer space. So the radiation level would be higher. But on the world average is 2.4. But there are variations from locality to locality, location to location.

Now 100 millisieverts is the maximum allowable levels for the workers of the nuclear power plants, meaning that simply put, there will almost be no negative effect on human health at that level. What happens at a higher level of exposure in terms of human beings? What is the fatality? At what exposure would a human die? For example, a 50% fatality, 4 sieverts, 4000 millisieverts, 4 million millisieverts, this would kill 50% of the people without any medical care. So after 60 days 50% would die at that level. But at a lower radiation, for example, there is some symptoms. At what radiation would there be symptoms? One sievert, 1000 millisieverts, or one million microsieverts, at that level you would start to

feel symptoms. At first there will be vomiting, nausea and vomiting would be felt as a symptom for the first level, which means below that level there would be no symptoms. At an even lower dose, 250 millisieverts or 250,000 microsieverts, at that level or below then even with blood testing he would detect nothing. 250 millisieverts and above causes leukopenia, loss of white blood cells. With blood testing you would see leukopenia. But if it is below 250 millisieverts, there are no symptoms, and even with blood testing there would be no change in the white blood cell count. However, let's say 200 millisieverts, if you are irradiated at that level, there would be health issues, that is, there would be an increase in cancer causes. Above 100 millisieverts there will be a higher risk of cancer incidence. 100-250 millisieverts means that in terms of blood testing or in terms of symptoms there is no change. However, in terms of future risk of cancer there will be a higher risk of incidence of cancer in the future.

Now 100 millisieverts, at 100 milli what would be the increased risk of cancer? 0.5% higher risk. So not rising to 0.5 but in terms of the Japanese people we have the highest occurrence of cancer. Japanese have the highest incidence of cancer because we live the longest. So it is because of the aging, cancer is aging after all. Women live until 86, men live until 80. The average is 83 years old. Japan's longevity is the longest. Cancer is because of longevity. I can't tell too much in cancer, but after all Japan sees the highest incidence of cancer. 50% of Japanese people, one out of two Japanese, does see cancer. 60% of men will suffer from cancer at any rate. Therefore in terms of background there is a 50% cancer incidence among the Japanese population. So this rises to 55% at 100 millisieverts. This is what it means by 0.5% increase. So 250 millisieverts cause 1%. So it is a linear increase. So it rises to 55% from a standard 50%. Therefore there is an increased risk of cancer. So correction, 50% rises to 50.5%. Correction, not 50 rising to 55%. By the way, CT scanning because Japan has the largest number of CT, it would easily be 100 millisieverts with a CT scan. In case of medical irradiation there is a gain. So there is no limitation if there is a medical benefit, a medical gain.

Therefore for the local workers on the site, for the workers on the site, it is about 100 milli. 106 milli has been observed, and this person has been hospitalized. But the reason is just because there is no other place to take. In terms of systems, there is no symptoms and blood tests would not show. The operator is doing fine, but there was nowhere else to take that person. So the person was taken to the hospital. But if it is more than 100, in terms of the legal limit of 100, it was beyond 100 milli. And therefore yesterday the Minister of Health Labor and Welfare raised it to 250 milli from 100 in terms of the legal terms. Without changing the limit no one can work on the site. This is already reported, but on the site, on the premises, I think it was between Unit 1 and Unit 3 per hour 400,000 microsieverts, which is 0.4 sievert has been detected on the premises. This is per hour. This has been detected on the premises. If you spend 10 hours, that is 4 Sieverts. Which means 50% or one in two would die. And therefore it is true that at least on the premises of very high level of radiation has been detected. It could be easily 100 millisieverts. If you keep the legal limit, no one would be able to work on the site. And therefore it has been raised to 250 milli. That was inevitable. However, it starts from 100 milli. So if it

reaches 250 millisieverts, there would be an increased risk of cancer. And in terms of leukocytes, it will start to go down in terms of white blood cell count. And therefore those limits had to be raised. So in that regard the workers are exposed to serious issues. 800 workers are close to the vicinity. According to the report, 70 individuals already have been exposed more than the limit, which means they can no longer work on the premises. The remainder 730 workers can still work. Each and every person will have to drop out after reaching the dose limit. And those who have dropped out reaching the limit they are already facing higher risk of future cancer. It is only the risk. It is only the risk. As I said, 50% goes to 50.5% or 51%. But it is true that now they are carrying a heavier risk of cancer in the future. And they drop out.

So the health effects on the workers is quite significant. But putting that aside, what you are most interested in would be what is happening in the local community and what is happening in Tokyo. And especially perhaps you are more interested in what would happen in Tokyo. Perhaps you have received the black colored paper as a handout. I have not one copy myself, but I have been given a photocopy of the flip chart being used in a television program. Looking at the environmental radiation dose, of course this changes every second, that is to say every hour, and also with the change in wind direction the changes. But at the maximum it is 1, as you can see, at the maximum 1 microsieverts per hour. And this dose, how much is it? One microsievert per hour. I mentioned about the health effect, the 100 millisieverts, that would have a negative effect. It would take 11 years at this level of one microsievert per hour, it would take 11 years. So if the radiation dose right at this moment in time if it continues for 11 hours, then you would reach 100 millisieverts, which may be a level that may give you a negative health effect. And having said so, one microsievert per hour.

So you have the hourly dose, and you also have the cumulative dose. The total exposure dose, perhaps you need to make a distinction between the two. For example, you have 100 millisieverts. Assuming that you are exposed in one instance or in one hour, and in just one hour if you reach that level in 11 years time, it is very different. For instance, in a Four Seasons Hotel where you have the hot water that comes out constantly, you would be able to fill in just three minutes the bathtub. I nod off often. I often open the water tap, and then I nod off and I forget that water is running. Then it fills and overfills the bathtub, but that is only for one instant. But what is the cumulative effect. But when it happens in 11 years? After 11 years and then you reach the 100 millisieverts, it means almost negligible health effect.

So for those of you who are living in Tokyo, what may be the health effect for you? I don't think you have to be worried at all because I myself have done nothing, for example. You don't need to wear a mask. You don't need to take a shower frequently. You don't need that. Now, what is happening in the local community around the Fukushima nuclear power plant? you're not allowed to go inside the 20 km radius. And from 20-30 km radius you are supposed to stay indoors and not go outside. Now what may be the dose there? Of course, it would change with time, but the latest data is more. It is more. It is 100 microsieverts per hour. In often cases it is 10-20 microsieverts per hour. So

when you look at how the hot water is running, that is very slow. But this is for outdoors only. If you measure outdoors, it is 10-20 microsieverts per hour. Indoors, it is 1/10 in most cases. So the local community if you are staying indoors, and oftentimes the monitoring is done inside of the car, inside a vehicle. But if you would measure indoors, it is 1/10 the level so if you are in an evacuation center or if you are indoors in your house, it would be one microsieverts per hour inside the house, which is almost comparable to the level in Tokyo. So as long as you stay indoors then there would be almost no harm. But what I have said right now especially for the foreigners, and even for the Japanese, the majority of the Japanese don't know about this.

Now I mentioned earlier that you are always exposed. Everyone is exposed wherever you live on earth. But everyone thinks in terms of whether you are exposed or not exposed. And microsievert and millisievert, the terminology is so very difficult for you to understand. And the relationship with an instantaneous radiation or cumulative radiation is unclear.

Then there is another handout. This is the twitter that I just started last night. This is only in Japanese. My apologies. But this is a twitter and therefore the timing is the other way around. The first part is the latest, and the last page just repeated. That is by mistake.

Please look at the fourth sheet. You can see on the right-hand side down at the bottom it says 4/5. Please find the fourth sheet at the bottom. This is my first Twitter, and it goes to the front part of the pages. So it says, "What is radiation?" It is transmittivity. It is particles and rays that is highly transmittivity. That is what I have started with my Twitter. This Twitter account this is the radiation therapy team of Tokyo University Hospital. I am the team leader. In addition to medical doctors, our team includes theoretical physics and reactor engineers as well. There are physicists, not only medical scientists. So on the one hand, we are medical professionals. In addition to that, there are physicists in our team. But the scientists and engineers, reactor engineers are also included in our radiotherapy team. And we are all writing in this Twitter. So this was initiated early last evening. But very surprisingly, 130,000 access was seen in 24 hours, in day one. In 24 hours 130,000 people followed my Twitter. Again I am sorry that is only in the Japanese language.

But if you read this Twitter, you can sort of understand what might be the potential health impact. In a nutshell, for the workers, yes, 250 milli is the cap. But as I said, they are prepared that there is going to be a higher risk of cancer incidence in the future for the workers on the site. Therefore I don't know any other language, but this is like the suicide fighters in wars. But for the general residents, for the general public the non-radiological workers, basically definitely there will be no health impact on the general residents. At Three Mile Island in the USA there was such a panic, and 30 years in the US new nuclear plants could not be constructed. That was the reason behind. So at Three Miles after all the local residents did not suffer from any negative health impact. The cancer incidence did not rise around Three Mile Island. So that is my feeling in that it would be the same as Three Mile Island.

Of course, when it comes to nuclear administration in Japan, nuclear business, it is true that it has suffered reversible damage. However, in terms of

health of the general public of the Japanese residents there is no health impact.

It is exactly 30 minutes. I would like to conclude my initial comments. Thank you.

FPCJ

Thank you very much. For the rest of the time I would like to accept questions. We will limit the questions only for the foreign press. Please raise your hand, and if you are designated, please use the portable microphone. And please limit yourself to just one question each for the first round.

Matsuyama, Bloomberg News, the U.S.

From Bloomberg news, my name is Matsuyama. Doctor, you have mentioned about the workers. So if you could give us more details. For the workers working in the plant what kind of protective gear and protective treatments as well as medicine are given to them? And what may be the intervals of their work operation? How many minutes are they allowed to work? If you could also mention if there is any special medical team.

FPCJ

Just one question each. If there is remaining time, later.

Dr. Nakagawa

I am not myself directly involved in the nuclear power plant operation. But I do have some knowledge. So what may be the protective gear? Or is there any medical team ready? Most probably there will be no medical team at present. Now for the protective gear, perhaps the company may have given them _____(inaudible) security. But basically it may not be that protective now. How many minutes? I mentioned earlier that initially it was 100 milli, but right now the maximum level has been raised to 250 milli. And in a real-time basis monitoring is being done. That is to say, the accumulative radiation dose. So they have set the limit. To take an analogy of the bathtub, to what extent could the hot water be accumulated, the level of the water? As time passes it will change.

Now, what about the medicine? Most probably they would have been given the iodine. In nuclear power plants when there is a dispersal of radioactive materials or radiation, it is just like pollen, to take an analogy. The nuclear power plant is just like a gigantic cedar tree, and the pollen that will be dispersed from the tree. But the pollen itself will not cause the allergy. But in this case it would not cause an allergy, but it would go through your human body. It is radiation. There are different types of pollen, to take the analogy. It would be the iodine which would have the most acute effect. That is because for the nuclear power plant there is radioactive iodine. And if it invades the human body, the iodine is being used in the human body as the thyroid hormone. You have to have iodine in your body in order to create or produce the thyroid hormones. But for the thyroid if iodine is in shortage, if it is a iodine hungry situation, then when the radioactive iodine comes in from the outside, it would eat up readily, voraciously, meaning that there would be concentration of radioactive iodine in

the thyroid. It is in iodine-rich situation already. When the radioactive iodine comes in from the outside, it is enough. You don't need any more. So if you have for the preventive measure have a stable iodine being taken in advance, that would be sufficient as protection. So I am sure the workers have been given such stable iodine.

I mentioned earlier about the Three Mile Island incident. The cancer has increased in case of Chernobyl, especially for the paediatric cancer. 100% of the 60-year-old women in the United States, if you had made a test for thyroid accidents, the women in their 60s they had a higher level of thyroid cancer. So with paediatric cancer the thyroid cancer had been raised in the case of the Chernobyl incident. The iodine exists in a large quantity in seaweed. And Japanese people love kelp. So if you take the stable iodine in advance for protection, that would work as protection.

Joel Legendre-Koizumi, RTL, France

Thank you for your presentation, Dr. Nakagawa. And we are quite reassured to see that we don't have anything to worry in Tokyo. But, nevertheless, some people have been saying, such as the French Embassy, but there was some major risk here in Tokyo. So I don't know where they got this information. Yes, yes, yes. _____(inaudible) France. We welcome your statement about the fact that we don't have anything to worry about the situation in Tokyo right now. Nevertheless, some people in the press have mentioned some comments made by the French Embassy saying there was a huge risk. And actually three quarters of our population has left Tokyo right now. So we were wondering if it is time for them to come back? But what would you think about the future based on what is happening right now in Fukushima and maybe other reactors in other parts, Onagawa, Tokai, or whatever. What would happen if major league each happened, meltdown or whatever happened in these areas? Do we have something to fear in the month ahead could we still live in Tokyo?

Dr. Nakagawa

Thank you for the question. So the containment vessel whether it is going to meltdown. A total meltdown of the containment vessel, that possibility is not zero. However, there is always a risk in the world. So you cannot say the risk is zero, but I would say it is almost nil, negligible. What the French Embassy people said, I wouldn't force them to return right now to Tokyo. But very soon in the very near future I sincerely hope that the French Embassy staff will all return to Tokyo. I cannot say the risk is zero. I cannot say that. I cannot say what percentage. I am not an expert in that area, but I am not afraid that there will be such a health issue in Tokyo. After 20 years when we reflect back on this incident, number one, regarding the nuclear administration of Japan, we will see a recession in terms of nuclear administration and nuclear industry. And because of this incident the health impact on the general public would have been zero. That is what we will find out in 20 years. That is my personal observation. Thank you.

About the containment vessels, what would happen when and if a meltdown occurs? In Tokyo _____(inaudible) probably 100 millisieverts on a cumulative

basis may be the dose to be found in Tokyo. So carcinogenicity level may go up, but I would say that the possibility of that is quite low.

Vivek Pint, Dainik Bhaskar, India

_____ (inaudible) India read by one million people. Thank you, Dr. Nakagawa, according to your handout here you are a professional radiologist. My question is, what are the main radio _____ (inaudible) which are present in the radiation release? 133 cesium, strontium 90, radioactive iodine, plutonium, or uranium? Thank you.

Dr. Nakagawa

I have to say no one knows. No one knows at this moment which radioactive substance was large because it is not easy to measure and differentiate at this stage. You cannot differentiate so easily. You are measuring radioactivity. So the nucleotides are not measured. Which element at what percentage is not measured at this moment. Distinction between those substances you mentioned is difficult. Having said that, theoretically you can surmise, theoretically. Because I am a medical professional, in terms of health impact the most important is iodine. That is the largest concern. Iodine is the most concerned of all of the substances you mentioned. Thank you.

Anthony Rowley, Business Times, Singapore

Could you clarify what you just said? In a worst-case scenario if there were a melt down of the containment vessel, I think you said 100 millisieverts cumulatively. What do you mean by that? I mean, these figures that we have here how far would they be likely to rise in a worst-case scenario?

Dr. Nakagawa

Well, nothing is certain. Nothing is really known yet. But roughly speaking, 100 milli and 200 millisieverts would be the level. But I cannot say for certain because it would depend upon to what extent the containment vessel is destroyed. But then having said that, is it a dose that would invite the deaths in people? It is in sieverts. From 2 sieverts and at 4 1/2, and at 7 sieverts everyone would die. It is not in that order at all. And most probably it would be less than 100 millisieverts. I don't think that anyone will be able to give you much clearer picture right now.

I mean the worst possible scenario, probably you are obsessed with the worst possible scenario. I mean, preparing is not bad, but there is an obsession with the worst possible scenario. And in life there are many scenarios, so you should not be too obsessed with the worst scenario.

Cao Jing Zhe, The Epoch Times, China

Radiation, as you mentioned, it radiates from food, and would there be residues? Residual radiation?

Dr. Nakagawa

As I mentioned, these are radioactive materials we are talking about. It is

radioactive. When I say radioactive, it means that there is a radiation which is transmissive. It passes through your body. It damages DNA inside our body. They are beams and rays. And radioactive substances emit such rays. I mean, we are all exposed to the rays I said, but there is a higher radiation. It is like pollen I said. In other words, take it the other way around. How can you avoid being exposed to pollen or radiation? Ask the question in that way. You should stay indoors. Because there are pollen outside your home, therefore if you stay inside your house, there would be less pollen. However, _____(inaudible) it would be 10% less indoors rather than outdoors. You cannot block everything. It is transmissive as I said. Therefore the radiation outside the house could permeate and affect you even if you stay indoors. However, in terms of the amount of pollen it would be much less. And therefore radiation would be much less if you stayed indoors.

Now, food, if it adheres to food. Let's say food was outside. Let's say this persimmon fruit outside, and eating the persimmon would not be good because obviously there would be pollen on the fruit. And if you eat that, it would not be good. Even inside the house let's say there was an apple. And although at the lower level there would be pollen. If you eat the apple with pollen, it would be internal radiation from inside your body. And that should be avoided. So you should be careful. You should cover the food with something, a physical sheet to cover the food. Have I responded to your question?

Foo Choo Wei, Singapore Press Holdings

Thank you for your presentation. I am from Singapore Press. My name is _____(inaudible). What I would like to know is at the very minimum everyone is panicking, for example, if you are in Tokyo. But then, in order to prevent any _____(inaudible) exposure, can you wear a mask? And would that be sufficient enough? What about the clothes you wear when you go home?

Dr. Nakagawa

For the radiation exposure, there are two different types: the external exposure and the internal exposure. The external meaning that the radiation attached to your clothes from outside, for example. Then you take off your clothes or you take a shower. You will be able to wash off. For instance, the analogy of pollen, meaning that you wash off the pollen on your clothes as well as on your body. And the clothes that you have taken off, you would try to hit it and pat it all over to let the pollen will be removed. You would shake it so that the radiation can be removed. I don't think you would see those kind of people in Tokyo. But, for example, if you are in the radius of 20 km from Fukushima nuclear plant, I mentioned that the 10-20 microsieverts per hour, which is quite high, I mentioned that indoors it is 1/10. So if you go outside, you should try to not have an intake of radiation. You will be able to wash off what has been attached from outside. So if you go outdoors, you have to wear masks. Or a towel, a wet towel over your mouth, meaning that there would be a lot of _____(inaudible) that you would not be able to have an exposure to that. And inside the house you should not have the ventilator working because it would have an intake of the air from outside. But if you are in Tokyo, you don't have to worry. You don't

have to worry at all.

MD Mokhlesur Rahman, Shaptahik, Bangladesh

I am from Bangladesh. Dr. Nakagawa, what happens if you are exposed directly to rain?

Dr. Nakagawa

Let's say again that it is pollen. And if there is rainfall precipitation, then in the rain droplets there would be small particles. There will be particles inside the rain. And if that is attached to your body, it means that there will be more exposure. So in the atmosphere without the rain, when it is raining it would be more in terms of volume. And because it is wet, it is easier to adhere to your body and clothes. Therefore under this circumstance if the rain falls, you should avoid getting wet. Therefore umbrellas should be carried at all times. Raincoats, rain gear, something portable that you can wear immediately or that is disposable raincoat, some cover would do.

Torin Boyd, Polaris Images, the U.S.

Thank you for your information. I would like to know about these potassium tablets. Are they very easy to obtain now in Tokyo? And also I noticed that some people have been hoarding the...

Dr. Nakagawa

It is the potassium iodide, potassium and iodine combined with a chemical reaction. It is called KLI in short. No, you cannot buy it in Tokyo. Local governments do have it in storage. Local governments, for instance, Fukushima prefectural government, and such governments. For instance, I am the doctor at Tokyo University Hospital, and KLI is a medicine, but we do not have any stock at all because everything has been purchased by the government. And I am sure Fukushima prefectural government does have, and also Ibaraki prefectural government does have. Wherever a nuclear power plant is located, the prefectural government does have the stock. But the dose has not reached that level that you need the medicine. But in any case, everything has been purchased by local governments. So you won't be able to buy in Tokyo.

Gu Xue Jia, CCTV, China

Thank you for your speech. I am from CCTV, from the Chinese Central TV. The Chinese audience is very worried about the Japanese circumstance. In the worst scenario, in the worst case if we plunge into the worst possible scenario, what would be the impact on Chinese public health?

Dr. Nakagawa

In terms of health, there would be no damage, no damage. Chinese people suffering from health damage, no. That would not happen, and not even in Japan. In the case of Japan, there will be a higher incidence of cancer in the future in the worst scenario. There would be a higher incidence of cancer if there was a total meltdown of the containment vessel, then there would be

higher incidence of cancer. But there will be no health impact on China.

In the case of Chernobyl, even at the Chernobyl incident in the Soviet Union, even at Chernobyl the only cancer that rose in incidence was thyroid, paediatric thyroid cancer as I said. Leukemia was expected to rise, but that did not happen. Leukemia did not rise. And in all other countries no cancer incidence rose, even at Chernobyl. Therefore even if a worst-case happens in Japan, Japan might see a higher incidence, which I do not believe is likely. But as I said, the Japanese people eat a lot of iodine by sea grass and seaweed. Japanese people are not iodine hungry, but there would be no health impact in China. Please be calm. Please be assured.

Andrew Horvat, Freelance

My name is Horvat. I am a freelance journalist but am also working for Stanford University. Nearby the nuclear power plant, especially the dairy farms will be impacted. Do you think that this will happen?

Dr. Nakagawa

It may be true that grass, for instance, inside the soil the radioactive substances will go underground, and water will retain that. So the cattle which eat the grass, so the milk as well as the meat the concentration of radiation may become higher. But if you look at the reality I said earlier that every food has radiation, even apples have potassium isotopes. There is a certain level, but the level may become higher. But it will not lead to any direct health effects. But, for example, Fukushima Prefecture produced the meat or milk. There could be rumors that the radiation may be higher. So in that sense there is a risk that they would not be able to be sold in the market.

Joel Legendre-Koizumi, RTL, France

I am going to file a story in 20 minutes, and I want to be sure that what you are going to say is going to be properly conveyed. NHK is saying today that the helicopter cannot cover these Fukushima reactors because there is too much radioactivity there. Do you confirm that? Is it true? Why? What's the level? Thank you.

Dr. Nakagawa

The helicopters themselves have nothing to do with radiation. If there is a helicopter, then inside the helicopter there are the Self-Defense Forces humans. The pilots operating the helicopters and the person who's going to sprinkle the water. I don't know how exactly they used to see water. But it is about the humans inside the helicopter, the cumulative dose. In the case of Self-Defense Forces persons whether it is allowed up to 250 milli I am not sure. I said it has been raised from 100 milli to 250 milli at least for the operators by utilities. But the helicopters piloted by SDF they are not TEPCO workers, and 100 milli would be reached easily. But real-time monitoring is conducted for integrated or cumulative dose. The cumulative dose _____ (inaudible) is measured starting from zero, the cumulative up to 95, up to 100. It is real-time counting and monetary that is conducted. So for the TEPCO workers it has been raised up to

250 milli. And once it reaches 250 milli they have to drop out from the workforce. In the case of SDF members I don't know whether it is allowable. It could be a lower allowable level, but there is a cap. And if one individual reaches that, that person can no longer continue to work on the premises. So that person will have to drop out from the workforce. In other words, if the radioactivity is very high, sprinkling by helicopter is not possible. However, what exactly the dose level is, I do not have that knowledge. With Unit 1 and Unit 3, and in between those is 400,000 microsieverts per hour. Then if that is the level, up to 10 hours and then the person will die. It is fatal after 10 hours. So it could be as high as that. I can only surmise.

Vivek Pint, Dainik Bhaskar, India

Is there a radiation released from spent fuel storage at reactor 4, Dr. Nakagawa? And what is the reason for that.

Dr. Nakagawa

I have to repeat I am not an expert on nuclear reactors. I'm a medical doctor. But I could guess that most probably yes there will be a leakage. But I am not an expert on reactors themselves. Sorry.

FPCJ

Dr. Nakagawa has to leave at eight o'clock so this is the end of the conference. Thank you.

(END)