

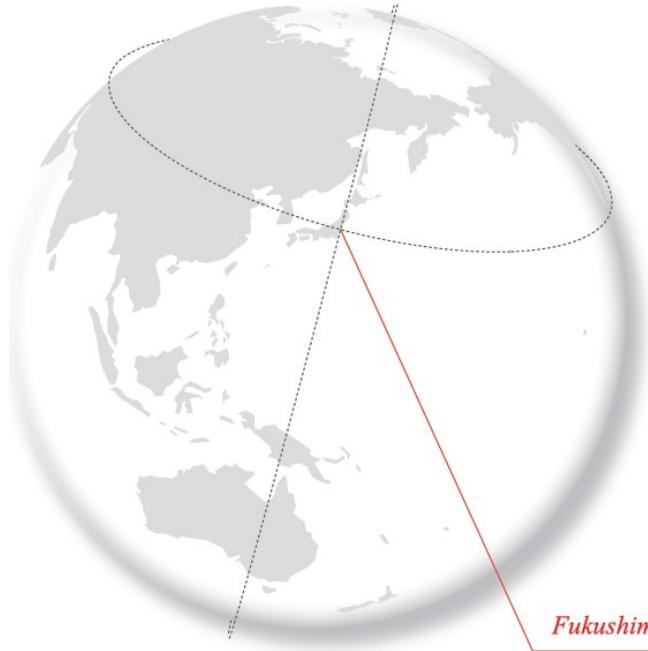
A collection of interviews with Mr. Hiroaki Koide,
Kyoto University Research Reactor Institute (now retired)

Can Such a Thing Be,
As a “Safe Nuclear Power Plant” ?
The True Stories of “Fukushima”



In the utter ruins and devastations left behind by the earthquakes and the
tsunamis, what can we do now?

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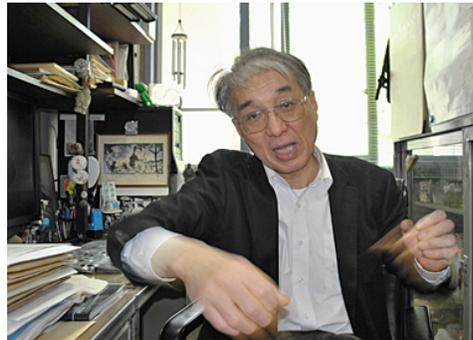


Fukushima Daiichi nuclear

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Preface

Since the accident at Fukushima on March 11, 2011, I repeatedly interviewed Mr. Koide of Kyoto University Research Reactor Institute, prompted by my irresistible desire to know what really happened to the nuclear energy plant, what the real situations were like and what we could do about that. That was because both the government and TEPCO(Tokyo Electric Power Co., Inc) es joint efforts to conceal true and exact information about the situations and their dirty manipulation of the public opinions, with helps from the major mass media and pundits seemed to me too much, too unpardonable to bear.



Hiroaki Koide

My first visit to the victimized areas was at the end of March, a few weeks after the accident. Before leaving, I had made two interviews, with Mr. Koide and Mr. Keiji Kobayashi (a retired researcher of Kyoto University Reactor Institute) respectively, in which I had told them my plan to visit the affected areas. They had given me the same advice to the effect that “I know you have a firm resolve for some degree of radiation exposure, but don’t make yourself a radioactive pollution source. Unless you take a safety precautionA you may unwittingly spread contamination in other places.

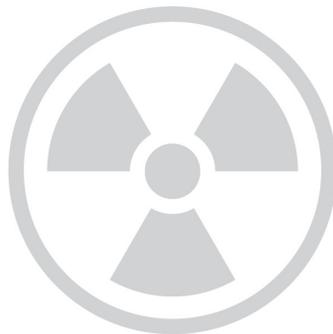
I advise you to wear the radioactive defense clothing in the areas and to make the sure and right disposal of it when you go out the areas. It is your responsibility.” They warned me not to be a radioactive carrier. This surprised and frightened me a lot, making me realize how naive I had been about radioactivity.

It is my impression of Mr. Koide, drawn from the interviews, that he is a scientist trying to inform the truth of the public as the party concerned – i.e.as a scientist who feels responsible for his failure to stop the nuclear plants in spite of his knowledge that they would bring about catastrophe on the human lives and society and the fauna and flora.

He said the clean-up procedures should have been based on the principle of estimating the worst that might happen, and criticized the TEPCO and the government for failing to do so, but did not utter any inflammatory remarks, passing fair judgements only by facts and inferring, not guessing, as the true scientist should be.

When he talked about the accidents and the TEPCO's dealing with them, his standards were simple and clear; how they were trying to protect and reduce the risk of Fukushima's childhood radioactive-related diseases, and how they were trying to safe-guard clean-up workers from radiation exposure. Fukushima's disasters involve many and multiple problems, such as almost impossible efforts to bring destroyed facilities under control, indefinite decontamination works, what to do with Fukushima's primary commodity markets, and so on, but the two things mentioned above that involve human lives are apt to be considered less serious. For example, in their efforts to assure the public of "everything being under control" , the government is planning to take families – many with small children – back into heavily contaminated areas near the plant. And the workers at the site – mainly subcontracted laborers – are being made to work without monitoring of radiation exposure.

Before the Fukushima catastrophe, Mr. Koide used to tell me the falseness of the so-called "nuclear power plant Renaissance" and relations between global warming and nuclear power plants, but the Fukushima's accident has changed his working environment. In addition to his usual research activities, he had to go out oftener to collect data, had to respond to many inquiries and questions from the media, social activists, and others concerned. He said laughingly, "I've lost the weight by five kilograms only in two weeks owing to the lack of sleep." But no matter how busy he was, he was as kind and receptive and sincere with people coming to him for helps and advices as he had been. I remember clearly the scene, where during our interview in his office a phone suddenly rang and he answered it politely and friendly no matter whom the phone was from.



Contents

1	Cooling to avoid an unprecedented reactor meltdown	4
1.1	Fukushima Disaster Approaching the Chernobyl Accident	4
1.2	Lesson 1; There is No Guarantee of Safety in Any Nuclear Plant	6
1.3	Lesson 2; General and Complete Withdrawal from Nuclear Plants is the Best Policy	8
2	No Inconvenience Without Nuclear Power Generation	9
2.1	“Sayonara” (good bye) to Nuclear Plants Free From any Incon- venience	9
3	The Disaster Sites Have a Mountain of Challenges,Difficulties, Dilemmas and Troubles to Handle	12
3.1	Worker can Stay Only for a Few Minutes at Workplace	13
3.2	Whereabouts of Contaminated Water	14
3.3	Raising the Exposure Dose Limit by 15 Times	14
3.4	Radioactive Materials Rather than Numeric Values	15
3.5	Some Going back to the Contaminated Hometown	16
3.6	No Need of Rolling Blackouts	17
3.7	Too Optimistic government	17
3.8	Information Manipulation	18
4	Safe and Stable Control of Nuclear Reactors Being Impossible	19
4.1	Spreading of Pollution of both Groundwater and Seawater	19
4.2	A True and Positive Operation Sheet Wanted	21
5	Protect children and the ocean from radiation damage from the Fukushima Nuclear power plant! Treatment of highly concentrated contaminated water is ur- gently needed.	22
5.1	Radiation contamination beyond Chernobyl.	23
5.2	We must protect our children, even if it takes evacuating them from the radiation contaminated areas.	23
5.3	Adults who have countenanced nuclear power plants must take responsibility	24

5.4	A massive amount of highly concentrated contaminated water is running into the ocean.	25
5.5	The government must disclose the oceanic pollution.	26
5.6	One can expect little from TEPCO's plan	26
6	There is No Recovering the Melted-Down Nuclear Fuel– A Long Way From Convergence	28
6.1	No Choice but to Face Radioactivity as a Nation except Innocent Children	29
6.2	What to Do to Protect the Children	29
7	Nothing has Changed in Nature about Japan and the Nuclear Energy Stakeholders' World since the Accident	31
7.1	Missing Nuclear Fuel	32
7.2	The Damaged Spent Fuel Pool on Upper Floor Of Unit 4	32
7.3	Unit 4 Will Withstand Another Earthquake, Says TEPCO	33
7.4	Detoxifying Radioactivity Is Almost Impossible	35
7.5	Japanese Government Doing Deliberate “Go-Slows” ?	37
8	Our Way of Life Questioned	38
8.1	Melted Cores Still Missing; Containment Vessels Full of Holes and Slits	38
8.2	Concern about Criticality in Unit 4 with Spent Fuel Pool; Extreme Difficulties to Remove the Rods from the Pool	39
8.3	Pursuit of Executive Responsibility before Electric Rate Hike	41
8.4	Two Conditions for the Proposed Debris Disposal over a Wide Area	41
8.5	The “New Safety Requirements” Justifying the Resumption of Nuclear Plant Operation before Finding Causes and Factors for Fukushima Disaster	43
8.6	A New Society to be Built: Now is the Time for “an Ideology of Darkness”	44
9	The Accident Beyond Human Control	46
9.1	ALPS: a New Purification System	47
9.2	Recovery Work in Unimaginable Contamination Environment	48
9.3	The Explosion of Unit 4 Caused by Ignition of Hydrogen Coming from Unit 3	49
9.4	The Disaster Situation Not Grasped by TEPCO	50
10	Cleanup of Neighboring Areas: “Decontamination” is a mere “Moving Contamination”	52
10.1	Poor Provisions for the Safety of Exposed Workers	54
10.2	Nuclear Core Recovery Impossible?	54
10.3	Oceanic Pollution All over the Pacific	55

11 Progress in Science	58
11.1 One of the Best Policies of Earthquake Countermeasures is “No Building, Not Operating any Nuclear Plant”	60
12 Brief History	62

Chapter 1

Cooling to avoid an unprecedented reactor meltdown

The first interview after the hydrogen gas explosion in Unit 2 following those in Units 1 and 3. The successive blasts showed the public the severity of the accident, but TEPCO, owner of the plant, did not know what was happening.

While Gunter H Ottinger, European Commissioner for Energy, said he considered the situation of Fukushima's nuclear accident "catastrophic" and "impossible to control", both TEPCO and the Japanese Government are repeating the cliché "the situation is calming down."

This interview took place on March 15, 2011, listed in No.1406, March 5, 2011.

1.1 Fukushima Disaster Approaching the Chernobyl Accident

— Tell us your understanding of the current level of the situation.

Mr.Koide: I think the problems at Fukushima are unprecedented, much graver than, say, the Three Mile Island nuclear accident, where the reactor containment vessels were not broken, though the reactor melted owing to the cooling water supply failure caused by the human mistake, but since the electric power source was secure, they could pump up water and pour it over the melted reactor to cool. A reactor melt, if it occurred at a nuclear power plant, could be contained to some extent through cooling.

At Fukushima, however, they are unable to use their cooling system at all, as the electric supply systems have been completely broken down. They rely

on entirely fire-engines' water hoses. And the reactor containment vessels are partly damaged.

Yes, very dangerous situation, indeed.

— The hydrogen gas explosion in Unit 2 is now the center of the public concern, but what about Unit 1 and Unit 3, whose building housing reactor 1 and reactor 3 were damaged also by hydrogen explosions.

Mr.Koide: Unit 1 and Unit 3 are on the same level of danger as that of Unit 2. At Unit 2 the turbine pump ran at first, but then it became dead and non-operative, so TEPCO has to rely on the fire-engines, which are pumping up sea-water and pouring it over the Unit 2 building. Units 1,2,3 are in the same dangerous situation in that there is no cooling system working in either of them. — What do you think will happen in the near future ?

Mr.Koide: Everything depends on one thing – how far the reactor cores will melt. As of right now (May 15), I don't think there are a lot of nuclear fuel rods having dissolved themselves into radioactive mass. It is imperative to pour a lot of water – sea-water or muddy water or whatever, you have no choice in this case – to prevent nuclear fuel rods from dissolving. If you fail in this, a lot of radioactivity will go out into the air through many breaches in the reactor containment vessels. Keeping to pour water to avoid further melting of reactor cores is a last-ditch on which all are staked.

— You say the extent of reactor meltdown is comparatively of small scale. What justifies the judgment ?

Mr.Koide: Everything depends on one thing – how far the reactor cores does and will melt. The radiation level on the premise turned out to be about 8 mSv of radiation (as of March 14), from which I infer that the meltdown is relatively of smaller scale than I feared. Full scale reactor meltdown would cause much more, perhaps hundreds of times as high as the March 14-measured result.

Let me explain. When atomic bombs were dropped on Hiroshima towards the end of the last war, 800 grams of uranium exploded, i.e. the nuclear fission occurred all at once, while in a nuclear plant of the same-scale like the Fukushima No 1 (generating a million KW of electricity), 3 kg of uranium is burnt a day.

It is the device that generates electricity by performing nuclear fission as large as 4 times of the Hiroshima-type atomic bomb blast every day. One-year operation of the Fukushima plant means exploding thousands of Hiroshima atomic bombs. And it also means that a large amount of radioactive materials including death ashes (radioactive fallout) pooling in the cores. These radiation materials will go out, in case of reactor meltdown, making contamination values outside much higher. In the nuclear meltdown at Chernobyl, death ashes eight hundreds times more than those the Hiroshima atomic bomb explosion generated (the famous “black rain) were emitted into the atmosphere.

Since the reactor containment vessels are damaged, radiation would go out freely in case of reactor meltdown, and since radioactive levels in the open air depend on how serious reactor meltdown is, it is my estimate that full-scale meltdown may not be occurring judging from the March 14-measured figure.

Anyway, there's no other way but to pour in water, which has the highest

cooling effect among matters existing on the earth, prevent reactor cores from melting. And it is necessary to mix boron in the seawater now being discharged into the three reactor containment vessels, because boric acid has a power to absorb neutron inside the atomic furnaces.

We have two impending risks facing us now; the risk of so-called China syndrome (the meltdown of reactors), and the risk of nuclear fission reaction of uranium, now suspended, going on again at any moment. I hope they will do the two jobs successfully.

— Can we believe the information on how the situations are like given by the government and TEPCO ?

Mr.Koide: First the information they give is inadequate, coming short in respect of amount and accuracy. Second the information they give is intentionally twisted, featuring and emphasizing only bright side of it. This has been the case with the nuclear industry long since the nuclear development began. For example, Mr. Edano, Chief Cabinet Secretary, announced of “radioactivity so low that it won’t affect human organism at all” when he explained the Fukushima situation the other day. I eve never known of any such radiation as giving no effects on human body. Radioactivity does have effects on humans , animals and plants. And we, researchers, are having a hard time doing our each specialized work urgently needed by the present emergency owing to the lack, scarcity and inaccuracy of data and information issued by the government and TEPCO.

1.2 Lesson 1; There is No Guarantee of Safety in Any Nuclear Plant

— What happened to the Fukushima plant when the earthquake and the tsunamis occurred?

Mr.Koide: I think what played one of the biggest causative role was no electric power supply. It is an irony that a nuclear power plant, despite it generates electricity, does not work without electric supply from outside. Especially when the operation stops, electric supply from outside is indispensable in order to cool the reactor with the water-pump, which does not run without electricity. But TEPCO said nothing about what became of the external power source and things went on as they did without anything being done nor attempted.

The fact is that the earthquake has cut off external power supply, and several batteries prepared for emergencies were dead owing to the tsunamis. But they could have used mobile power supply vehicles. Yet it seemed to take forever to secure and arrange power-supply cars, while they were dillydallying things went worse and worse. I wondered why. Then TEPCO made it known four days later that their connecting points were under the water so they were unable to connect power supply cars to the pumps. Why did it take so long to inform the public of such an important fact ? It is a built-in tendency of the nuclear industry to try to hide dirty linen.

Now they rely on fire-engines to pump up seawater and to pour it over and into the reactor containment vessels. But I thought they had fresh water stored in pools in the premise. Why don't they use it ? Perhaps the fresh water pools have been damaged by the earthquake, that's why they use seawater. Then, why don't they say so? It is another example of their built-in tendency of keeping everything secret.

If injecting cooling water into the reactors with fire-engine pumps were working well, then there would be no fuel rods exposed in the air; they should be safe in the coolant water. But it was found that there is no water in the containment and the fuel rods in there are exposed in the air, dry and dangerous. I wonder where the injected water have gone, evaporated or escaped somewhere, @I don't know. I can't come up with any reason why. TEPCO doesn't give any explanation for the phenomenon. This is a very serious matter, but both TEPCO and the government keep silent about it, in spite of the public demand for information and explanation.

— What caused the explosion around the reactor containment vessel in Unit 2?

Mr.Koide: It was a hydrogen explosion in the pressure suppression container which is the integrated construction within the reactor containment vessel. Normally it should be filled with nitrogen and no oxygen involved inside. As you know, oxygen is needed in an explosion. So I guess the chamber might have got tiny holes in the wall or somewhere through which hydrogen, generated by the melting of zirconium (coating material over uranium), ran out and took part in a chemical reaction with oxygen in the air, producing the explosion. But this is only a guess.

— Does the explosion in the reactor containment vessels mean a very serious development to the worse, like stepping across a red line ?

Mr.Koide: I may have to say so, since the reactor containment vessel is the device which confines radioactive materials. As long as the containment vessel is safe, you can control radiation even when you have to do vapor emission in order to reduce the pressure increased in the container, by, say, using filters and the like. There would be room for human intervention to avoid possible dangers. But now that the reactor containment vessels are in disrepair, there's no room for human intervention to take defensive measures.

— The government calls for the evacuation of the residents near the plant to 20 km away from it. Is the 20 km distance from the damaged plant all right ?(cf. The US embassy in Japan, believing the Japanese government was not telling the full story, advised Americans in Japan to leave areas within 80 km from the plant)

Mr.Koide: It might be OK only in the sense that it is far enough for avoiding acute death from radioactive contamination, but even in that case, the residents living downwind should be given high priority of leaving. The wind, however, changes direction. An evacuation plan or guidance will be very complicate and difficult to make, since you have to take account of the changing weather conditions, disaster situations in the plant, degrees of pollutions, and the various circumstances and conditions surrounding the residents. At any rate, early and fast and exact and pertinent information must be given to the

residents, who will plan and prepare their evacuation based on the information.

But I am sorry to say that, under the present situation deteriorated so far, the 20 km away for the hotspot will not be enough for securing safety for the residents. I think the disaster level is much higher than the Chernobyl disaster, so the government should designate all the areas within a hundred km from the plant as evacuation zone. Some suggest it would require the area surrounding Tokyo, 40 million people, to be evacuated.

1.3 Lesson 2; General and Complete Withdrawal from Nuclear Plants is the Best Policy

In the first place the accident prediction or postulated severe accidents they made when they planned to build the nuclear plant was too optimistic, showing no sense of responsibility. They refused to hear our professional warnings such as about bad reactor design, not to mention the popular critical voices and accusation of “collusion” between the government and TEPCO. That starts the whole thing. Their blaming the earthquake and the tsunamis for the nuclear accident is nothing but an act of evasion of responsibility and shows the lack of willing to learn from the Fukushima disaster on the part of the nuclear industry.

What is needed is public discussion of how to manage and overcome the stricken power plant, though really difficult and almost impossible a job it is, and what lessons to learn from Fukushima. The less we know about the past and present conditions of Fukushima, the less we learn about the risk and danger of the nuclear power plant and the more susceptible we are to the government and the nuclear industry’s lies and public manipulation.

The lesson the present accident teaches us is that there is no guarantee of safety in any nuclear power plant. As you see, several layers of defense systems were broken down one after another. It shows that , in addition to the extreme difficulty of the human artificial and technical control of nuclear energy , a failure in it surely invites irreparably-harmful consequences, a kind of nuclear holocaust, which will last for hundreds of years.

The next lesson, the most important one, is that we should cut off our reliance on nuclear energy once for all. That impossible Chubu Electric Power Company’s nuclear plant at Hamaoka, which stands on the very epicentral area of Tokai earthquakes, should be decommissioned at once.

If the Japanese don’t learn these two lessons , well, I must say, we are a hopeless nation.

Chapter 2

No Inconvenience Without Nuclear Power Generation

Mr. Koide presents concisely the essence of his argument against nuclear power plants. In fact, as of right now when no nuclear power plant is operating in Japan, we do not suffer from any electric shortage.

This talk was listed on No.1408 issue of the Jimmin Shinbun, May 25, 2011.

Mr.Koide: If you want to take the most effective measure to defend yourselves from atomic power accidents, you should agree on the all-out abolition of nuclear power plants. No nuclear power plant is the surest way to avoid the hell-like nuclear disasters.

Now we get 30% or less of power from nuclear plants, so most Japanese tend to think the discontinuation of nuclear power plants leads to electricity shortage and that they cannot help accepting them as a necessary evil. “Don’t use electricity,” shout those who say yes to nuclear plants to those who say no to them.

2.1 “Sayonara” (good bye) to Nuclear Plants Free From any Inconvenience

But in terms of plant capacity of generating electricity, the total electric generating capacity of all the nuclear power plants together in Japan is only 18% of the whole.

But in reality nuclear plants provide 28%~30% of the electricity used by the nation. The reason for this is that they operate the nuclear power plants in full blast, while they make thermos-electric power plants close up operation. Suppose the thermal power system (such as coal-fired, gas-fired, oil-fired stations) takes over the task of producing the 28%~30% said to be generated by the nuclear plants, it means that 70% of Japanese heat power stations will be in operation. That is to say, we have too many power plants in Japan. Electric generating plants in Japan are so many and so abundant that we have to stop the operation of the half of them. The annual average rate of operation of power generating facilities is on 50%.(See figure 1)

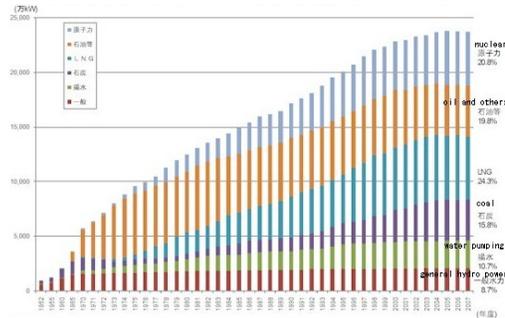


Figure1 the transition in the capacity of power generating facilities

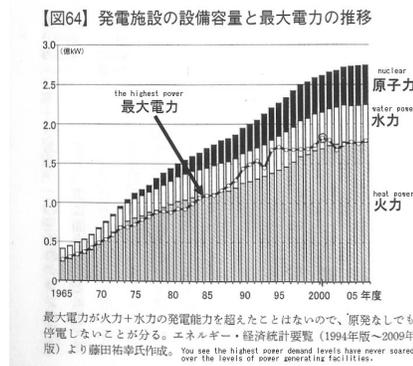


Figure 2 the transition in the capacity of power generating facilities and the highest power demands

The government and the electric power companies justify the need for the nuclear power system by arguing that since electricity cannot be stored for future demands, it is necessary to build extra-facilities such as atomic power plants in order to prepare for potential demand peaks.

But the examination of the record shows that the highest power demand level has never exceeded the total amount of power supplied by the existing thermal and hydro power generations combined.(See figure 2) Still they argue that if the nuclear power plants are to be abolished, the nation would be in trouble from electricity shortage when draughts make it impossible to use hydro power generation systems or when some thermal power plants are in disuse owing to their periodic checkups , particularly in case these disuse periods coincide with the peaks of energy demand. But as everyone knows, peak power usage takes place for a few hours of a few days in the midsummer in a year. You can make up for such a little shortage by home generation systems, or adjusting hours of manufacture plants, or the household's little effort to save electricity, or others ways.

I should say NOW (when no nuclear power plants are working owing to the

accident and periodic checkups) is the time to get rid of atomic power generation system free from any inconvenience . (Translated by Yoshiaki Wakihama)

Chapter 3

The Disaster Sites Have a Mountain of Challenges, Difficulties, Dilemmas and Troubles to Handle

On April 18, TEPCO announced a roadmap of cleaning up of their damaged Fukushima-1 plant. According to it, the company would build a cooling system in 3 6 months, and put the atomic furnace under safe and stable control about 9 months later. Even without the Chernobyl accident and the Three Mile accident, everyone can see the absurdly optimistic, irresponsible and inaccurate nature of the roadmap based on TEPCO's wishful thinking. Talking on it, Mr. Koide pointed out the lack or inadequacy of measures to deal with huge amount of radioactive water pouring out into the ocean and , explained the severity of the working conditions and criticized the company's indifference to the workers' safety against radioactive contamination.

Since the whole premise of the plant is being radioactively polluted, not to mention the inside of the buildings housing reactors, it is highly questionable whether the workers can carry out their work safely. And holes opened on the wall of the pressure container have not been repaired. And heavily radioactive concentrated water are running out in large amount every day. And TEPCO seems not to know what to do with the situations. Instead of admitting being in fact up against the wall, TEPCO talked optimistic views mixed with lies and misinformation. And the company threatens the criticizing residents with rolling blackouts in the summer when demand for electricity increases.

Mr. Koide severely criticized TEPCO's attempts to cover up the pollution information, and as to the rolling blackout plan, he said, "it will be unnecessary"

, and it proved that he was right.

This interview appeared in the No. 1410 issue of the Jimmin Shinbun, April 15, 2011

3.1 Worker can Stay Only for a Few Minutes at Workplace

— What do you think of TEPCO’s roadmap to clean up the accident? They say it will take only a few months to stabilize the situation.

Mr.Koide: I wish they would succeed, but their plan is too much optimistic. The nuclear reactor-related works are extremely risky and difficult. The nuclear cores almost melted down, contrary to the early surmise of small-scale meltdown and the pressure containers in which the cores are housed, and the containment vessels wrapping the pressure containers have both been broken. Under these conditions, any normal cooling system does not work. If you want to recreate a situation where cooling the nuclear reactors can be continuously and steadily done, you have to construct something like cooling circuits anew from scratch. But as you know, big amounts of radiation have been spread all over, the construction work must be forced through in the midst of radiation exposure. The mere thought of it gets me horrified and depressed.

TEPCO said it would accomplish the work “in three months.” Their prospect in the roadmap is as optimistic and irresponsible as the earlier one in the planning of building the Fukushima1 plant. They are learning nothing from the accident!

— Please explain about risks and difficulties accompanying the work in the spaces full of radiation.

Mr.Koide: The work places would be so full of radiation that a worker could stay there for only a few minutes. Workers have to take too rapid and quick turns at the work to do the job well. The restoration of an electric power source and reoperation of the pumps for cooling with the restored electricity is highly technical procedure only professional experts can do. But these experts have already become sick after bathing radiation past the margin of safety. It is in effect impossible to find another set of experts of the same kind.

Another difficulty is with equipment and fixtures. TEPCO insists that it will fill the reactor containment vessels with water, but they are badly crushed with holes and slits in the floor or the wall or somewhere. Unit 2, in particular, has holes in its suppression chamber (pressure container), water poured in will go out through them. None know how big the holes are. To enter the chamber to see the sizes of the holes would be an adventure at the risk of life. It is TEPCO’s plan to clog the holes with grout (a kind of cement to plug slits and holes), but I don’t think it feasible.

The same is true with Unit1 and Unit 3, which are also in miserably damaged conditions to the same extent as Unit 2 is. It would be very hard to try to

submerge them in water; however much water they throw in, water leaks through holes and slits.

In addition to it, I must say that a reactor containment vessel itself is not so constructed as be able to contain water, so if you keep filling water into it ignoring the its structural weakness with water, it may go broken at some part at some point.

3.2 Whereabouts of Contaminated Water

— Does the phrase “it may go broken” mean another explosion ?

Mr.Koide: No, it doesn't. The turbine building, the trenches and the pits in Unit 2 will all be drenched with water. As the trenches and the pits are made of concrete, not water-proofed, water leaks out. And they may be damaged by next afterquakes. They may be already broken in part by the main earthquake, and will be further broken by next aftershocks.

— TEPCO says “we will contain radiation.” Isn't it practically impossible?

Mr.Koide: It is impossible, that is why radioactive contaminated water is escaping in to the ocean every day, polluting the sea more and more. It is quite natural that water, poured into the containment vessels full of holes and slits, go out of the vessels, some remaining pooled in the turbine building and trenches seeping into the soil polluting the groundwater. To clear this situation, it is necessary to move the polluted water from there to another place, and there is no another place.

TEPCO announced at last that they managed to move 660 tons of the water to steam condensers, but the condensers will soon be filled to capacities. Next work is to translocate the water to the waste liquid treatment building, which has the capacity to accommodate ten two thousand tons of water, despite of the amount of the poisonous effluent reaching over sixty thousand tons in the premise. A lot of impromptu waste water tanks must be prepared to stock toxic water tentatively, but what should they be going to do with them next ?

3.3 Raising the Exposure Dose Limit by 15 Times

— How much do you suppose the amount of radiation in the workshops?

Mr.Koide: It is not known for certain. It is said to be 1000 mSv per hour, but it will be higher or lower from place to place.

Take me, for example. As a person engaged in radiation business, my exposure dose is limited to be 20 mSv per year. Now “Sv per hour” shows exposure intensity and “Sv” shows total exposure dose, so in terms of working in a workshop in the Fukushima plant with the 1000 mSv contamination, I am not allowed to stay there for more than one minute. That is what the law said thus fat. But the government has changed the 20 mSv limit to 250 mSv limit. Even under the raised level of radiation dose limit, a worker can stay in a work- site for no more than 15 minutes.

— What does the annual dose limit mean? Does it mean that a worker whose radiation dose reaches 250 mSv must stop working that year, but he or she can start working again next year?

Mr.Koide: No, he can't. A worker dosed with over 250 mSv should be unable to get engaged in any radiation-related job anymore. But judging from the fact that the dose limit has been raised to cope with the critical situation, ignoring the workers' safety and life, a kind of malpractice, such as manipulation of radioactive-covered detection, may happen in order to secure the workforce. In fact this kind of misconduct on the part of the companies, often happened in the past and there are many radioactively over-exposed workers still working now.

3.4 Radioactive Materials Rather than Numeric Values

— The government disclosed the areas and extent of radioactive contamination at last. Do you think the data published by the government accurate?

Mr.Koide: The numeric values the government published, such as so-and-so micro-sieverts per hour at so-and-so areas, are based on their evaluation of dose-levels of gamma rays in the air. But what really matters is not so much numeric values themselves as radioactive materials radiating that much numerical values. Are they iodine, cesium, plutonium, or all of them ? Neither the government nor TEPCO says nothing about them.

About the radiological dosage of marine pollution, they released sporadic measuring data, yet the data are not even close to being enough. Let's suppose they gave me the job, then the first thing I would do would be collect seaweeds in the coastal water and check their pollution. Based on the data gained from the examination of the seaweed I would draw a pollution map showing degrees of contamination at various spots on the north of the plant from up close to farther away. This would give the public precious information about how wide the radioactive pollution is spreading. I think TEPCO did some research on the seaweed, but they have not published the results.

Sea pollution is a matter of life and death to the fisherfolk. They have no way of knowing whether the seafood they catch and land are safe to sell or not.

— From the standpoint of nuclear scientists engaged in the research on the effects of a nuclear plant accident, is checking the pollution of the seaweed a routine procedure ?

Mr.Koide: Definitely. It is the common practice for those studying environmental contamination to check the pollution of the seaweed when they want to know how far the radioactive contamination of the sea has spread. I am sure TEPCO did the survey on the seaweed.

— TEPCO conducted surveys on the radiation contamination of the seaweed and keep the results secret from the public. Then, isn't it possible that they also keep what radioactive materials are in the air secret from us ?

Mr.Koide: Most likely they do. I carried on the test and analysis of the air containing radioactive constituents, and other researchers, including those hired by TEPCO, did, too. But they hid the data, maybe for fear of panic among the public at knowing that the air they breathe in is full of toxic substances , or for other reasons I don't know. They always want to play down the scope of the disaster and the potential health risk.

— Mr. Imanaka , your colleague at Kyoto University Research Reactor Institute, and his associates published their research data. They could do it because they are independent from TEPCO, couldn't they?

Mr.Koide: Yes. They examined contamination of the soil in Iidate village, a village the government classified as planned evacuation zone (a place advised to be evacuated for a month), and published the resultant data. This surprised and rattled the government, which disclosed their data in haste, saying “we already did the contamination research” , like a child defending himself.

— But that publicly available information doesn't tell exactly and honestly how grave and serious the pollution is in the contaminated areas, does it?

Mr.Koide: No. There is no data at all concerning the areas within a 20 km radius from the plant, in particular. I hear about a horrible story often told by the research party people, like “when we found bodies, their radiation contamination were so strong that we could not bring them back, so we came back leaving the dead behind. “ There is no knowing how high and dense contamination are.

3.5 Some Going back to the Contaminated Home-town

— Some evacuees are going back to their deteriorated land in Minamisouma city, saying “ I don't mind pollution any more. I want to live my old way of life in my hometown again.” Is it possible for them to live the way they used to ?”

Mr.Koide: At Chernobyl accident, 400 thousand residents were forced to evacuate their villages and towns. Well, “evacuation” , just one word, however does mean a lot more than simply moving from one place to another; it would mean the destruction of one's life, negation of one's hope, relationship, one's past , indeed, everything. That's why people are dying in evacuation centers. Even when they are transferred into the provisional housing now being built, that will not mean that they regain their old life.

At Chernobyl, too, many local people are going back to their old polluted houses, driven by their nostalgia or their strong wish to live the old good times again, risking a contamination. The same thing is happening in Minamisouma city, I think. Of course the returnees may face the risk of cancer and the number of cancer patients will increase, say, in ten or twenty years , but it is not likely that they will die very soon under the present level of contamination. It is quite natural that there appear some people who choose living their old life in their beloved home place and die there rather than living in unfamiliar ways in

unfamiliar places suffering feeling of alienation. There is no laws that prevent them from doing so in Japan.

3.6 No Need of Rolling Blackouts

— TEPCO announced that they would plan to rolling blackouts to ride out power shortage predicted in summer. You have maintained, since even before the nuclear accident, that Japan's power-supply security was and is OK without nuclear power. Then you don't consider the rolling blackouts necessary, do you ?

Mr.Koide: Any planned rolling blackout is not needed at the peak of power demand in summer. Just now many heat power plants are not working as well as nuclear plants, and it is true that supply of electricity will be less than usual. But, as you see, it is not the nuclear power plant alone that has got damaged by the earthquake; many industrial facilities have also been brought to a standstill by it, so, I think power demand will not be as big as usual in the coming summer. Add efforts to save electricity waste to it, and we can safely overcome predicted slight electric shortage in summer. Personally I think it very important to try to stop big business' lavish expenditure of electricity on production of socially unneeded goods and services in order to make money.

3.7 Too Optimistic government

— I notice the mainstream media such as NHK (Japan Broadcast Corporation) and major commercial broadcast stations collaborating with the government and TEPCO in the attempt of playing down the scope and intensity of the disaster. They make famous commentators and pundits on TV, who praise the government policies such as changing evacuation orders and encouragements and raised the standard of dose limit for radiation exposure by saying the government has turned to a sustainable long-term strategy in dealing with the disaster from the hitherto day-to-day ad hoc measures.

Mr.Koide: The changing the scope of evacuation areas and the raising of the dose limit standard show that the government and TEPCO are being cornered by the formidable situations. And yet the media estimate it optimistically, or intentionally do so, to put the public at their ease. The government, TEPCO, the mass media and popular commentators all alike lack understanding of almost impossible hard mission at the working site and of suffering of the residents. An unexpected problem after another occurs at the disaster site. People are dying or getting sick in shelters. So-called experts (many of them get paid by nuclear energy industry) are wrong in their belief that we will be safe as the government has shown only one plan to deal with the accident.

— What, in your judgement, is the worst error they (TEPCO and the government) have committed ?

Mr.Koide: The biggest error is their underestimating the power of the

nature when they were planning to build the plant. “No big earthquake nor tsunami is likely to happen” or “the plant facilities will be strong enough for any natural disaster,” they might have thought. Compared to that mistake, various mismanagements in the ex-post measures are of small matter and , in a way, inevitable because the problems at Fukushima are unprecedented in human experience.

— You pointed the optimism and twist of the media’s coverage on Fukushima, but we, people, have nothing but mass media to rely on to learn about what’s happening at Fukushima and their effects on us.

3.8 Information Manipulation

Mr.Koide: Japan is the country where the state controls information. It was so in the past and it is so in the “democratic present days.” You know the notorious “Imperial General Headquarters’ Announcement” which kept disinforming the public of military gains during the war, but such is still the case with the present Japanese society, with Fukushima included. Television, the radio, newspapers and magazines give out the kind of information the authority provided them with or agreed to disclose. Innocent people tend to think so-and-so information must be true because the newspapers as well as the government say it is true. But people should, like I do, always smell any government disclosure or statement fishy.

All you have to do is to trying to find and collect reliable information by yourself. It is hard, but you can get some help from the Internet. You see, there is an online site called Youth Stream, which broadcasted my lecture on Fukushima live. More than 12 thousand people browsed it and many posted (and still posting) their opinions about what I said. Here you can see an example of exchange of information and ideas. Many people also express their thoughts and what they saw or experienced via Twitter.

Recently the way to organize demonstrations has changed. In the past people took part in a demonstration mainly based on the up-to-down mobilization order issued by the heads of labor unions ,political groups and parties and thought groups. Now it is each individual’s free and independent decision that determines whether to join a demonstration or not and that decision depends on what he or she learns via the Internet. Don’t you think it interesting ?

Chapter 4

Safe and Stable Control of Nuclear Reactors Being Impossible

TEPCO's stabilization roadmap issued in April, 2011 said that it would attain "Cold Shutdown" of the nuclear reactors in three six months. The cold shutdown means to bring reactors safely to the state of shutdown by cooling them while suppressing nuclear fission.

In December 2011, Prime Minister Noda declared "the state of cold shutdown" of Fukushima reactors, but even NISA (the nuclear and Industrial Safety Agency) of the Ministry of Economy, Trade and Industry raised questions about the declaration by saying "under the situation in which the reactor containers are severely damaged and nobody knows exactly where melted cores from Units might be, what significance do temperatures at the basements of the pressure vessels have?"

The following talk appeared on No. 1413 issue of Jimmin Shinbun, on May 15, 2011.

4.1 Spreading of Pollution of both Groundwater and Seawater

Mr. Koide: When, 1) a pressure vessel is not damaged nor broken anywhere, in the state of normal and healthy condition, 2) and a reactor core is neatly housed in it, 3) and the cooling system is working, then you cool down the reactor core, keeping a constant temperature of 100 degree or less; the situation mentioned above is called "cold shutdown." But take Unit 1, for example. The nuclear reactor has melted down and the melted core (corium lava) is going out through holes or slits of the floor of the vessel. Some nuclear fuel may have dropped

down to the bottom of the reactor container and you can guess that there may be no nuclear fuel in the pressure containment vessel. How can that situation be called “cold shutdown” ?

It is most likely that melted core in the form of super-high temperature lava of nuclear fuel is going through the pressure container and then passing through the floor of the nuclear containment vessel., too. You can see it easily from the fact that there is over 4 thousand tons of water retention on the underground floor of the reactor building. TEPCO keeps pouring water into the containment vessel to cool, but the water is escaping it to the nuclear containment vessel, from which it is leaking down to the basement floor of the reactor building. The floor of the nuclear containment vessel is clearly broken.

Where does nuclear fuel lie? There are two possibilities. It may be at the bottom of the nuclear containment vessel, submerged in the shallow water retention, in the form of “a loaf of red bean bread” (the exterior being hard cooled by water, and the inside being molten liquid with super-high temperature). Or it may already be out of the nuclear containment vessel.

This impossible situation is the first experience human beings have had in over 60 years since they began to use atomic reactors. We are in the midst of the unprecedented horrible disasters, and we should all, particularly TEPCO , the government and other involved parties, keep it in mind unwaveringly.

Despite the containment vessel being damaged and polluted water overflowing down into the basement of the reactor building of Unit 1, I don't think a large amount of radioactive release out to the air happening yet. That is because , I think, the thick concrete floor of the reactor house, under the nuclear containment vessel, has not been cracked yet and it contains most of radiation inside; though I am afraid it will be a matter of time for the concrete to be eroded by the melted nuclear fuel.

Unless something is done to stop it (though it seems a humanly impossible task since nobody knows what is happening inside), the melted nuclear fuel will make its way through the concrete floor down out to the ground by and by. The concrete floor of the building housing the pressure container and the nuclear containment vessel will, sooner or later, or already, severely damaged and allow the melted nuclear lavas go outside. If this happens, I mean, if nuclear cores pass through the concrete floor to outside, the situation will get almost completely out of hand, with any cycling cooling of no use, and people having to pour water blindly everywhere onto the ground since nobody knows where nuclear cores lie anymore. Nuclear lavas will find their way(s) in the ground dissolving rocks and soils, and make contact with groundwater. Meeting of corium lavas and the aquifer means a large scale contamination of a big reserve of groundwater, which will sooner or later migrate toward the Pacific Ocean. This would cause a much greater and much more serious maritime pollution problem than what we are facing now.

All that I told you now , of course, belongs to an alien territory, and cannot be said to@be accurate predictions, except that it is a logically valid inference. I wish the nuclear lavas would stop moving somewhere before they contact groundwater. At any rate a countermeasure as of this moment must be figured

out to stop the flow of the melted nuclear fuel. Of course it is necessary to pour water into the reactors for the purpose of cooling them, but it also means more and more additional increase of polluted water, which is sure to enter the sea. How to dispose radioactively contaminated water is urgently needed to be figured out.

Now things have got actually beyond human control. Under this unprecedented situation, resetting the conventional methods and way of thinking is urgently needed. TEPCO and the government and experts concerned should have serious second and even third thoughts about what to do.

To put lead or liquid metal in the reactor along with water would be of little effect, since most of atomic fuel has passed out of the reactor down to the floor of the covering building. Personally, I would like to suggest that it the circumstances leave us no other choice than to seal the whole site in the Sarcophagus (stone coffin) like they did in Chernobyl, judging from the fact that the cold shutdown situation is unattainable and that nuclear fuel has gone out of the reactors and can be located nowhere.

How the disastrous situation develops in the future is unclear. Even if such a large-scale radiation release as seen at the Chernobyl accident could be avoided in our case, it would be only on the short-term basis. When you see the situation in the long view, it is certain that almost the same or more amount of radiation would come out from the damaged plant and pollute both the air and the sea, because, as you see, the disaster is still going on and will be going on far into the unknown future. It is the fisherfolk alone that suffer from the radioactively polluted sea; it is the Japanese as a whole that will be at a loss about how to survive.

TEPCO, unconcerned about the anxiety and suffering of the fisherfolk and people, declared that it would not change the present way of dealing with the disaster, that is, water burial of the reactors. But since it is sure that the reactor containers are damaged, and part of reactors themselves are missing from the containers, their sticking to the current style of pouring water into the containment vessels would only let the convergence work drag on indefinitely. Why don't they walk away from it and try what is really needed?

4.2 A True and Positive Operation Sheet Wanted

The roadmap was, in the first place, not the plan TEPCO expertise working at the site beat their brains out to make. It was a kind of temporary measure prepared by the bureaucrats in the Tokyo Head Office to satisfy the government who demanded importunately TEPCO to "show the way" to convergence. While the big shots in the Head Office insists on their sticking to the roadmap in the political context with the government, engineers and workers on the ground of the Fukushima plant are wanting a true and positive roadmap for them to work upon. It is my hope that they try to find and build their own operation sheet by themselves.

Chapter 5

**Protect children and the
ocean from radiation
damage from the
Fukushima Nuclear power
plant!**

**Treatment of highly
concentrated contaminated
water is urgently needed.**

MEXT (Japanese Ministry of Education, Culture, Sports, Science and Technology) announced in April 2011 that the radiation exposure limit for children to safely attend school in Fukushima is lower than 20 millisievert (sv) per year. However, for adults in general the radiation exposure legal standard is 1 millisievert per year. Strong criticism rose against MEXT for raising the limit for children, who have higher sensitivity, to be 20 times more than the adult limit. Later, MEXT withdrew their statement, but it had already become clear that they had tried to spread a radiation safety myth at the children's expense.

The following appeared on No. 1415 issue of Jimmin Shinbun ,on June 5, 2011.

5.1 Radiation contamination beyond Chernobyl.

@ **Mr.Koide**: [In April,] the Nuclear and Industrial Safety Agency (NISA) announced that the amount of radioactive materials released [into the air by the Fukushima nuclear accident] was 370,000 terabecquerels, but after recalculating it, they corrected it to 770,000 terra becquerrels [in June]. (terra: 1 trillion times)

This kind of number can be easily manipulated by the evaluation method. I believe that the actual amount must be much higher. In addition, the amount of radiation released into the ocean still remains unknown. This time, NISA said that they added the amount of radiation discharge into the ocean to the previous amount. Even so, I think this new estimate is still too low.

Initially, NISA set the nuclear accident severity level to 7 [the highest on the International Nuclear Event Scale] based on 370,000 terabecquerels of radiation emission [in March], but this time the amount of radioactive emissions turned out to be twice as much as their previous result. The accident in Fukushima is ongoing, so the total radiation emission will be much higher than the current level. It might be very close to Chernobyl or even beyond it.

The radiological dosage of marine pollution is still unknown. Now the government has increased the points of oceanographic research and has shown its measuring data sporadically but there are way too few measurement points [to collect accurate data]. To learn the radiological dosage, one can find it easily by checking the pollution of the seaweed on the shore line but I have never seen any research data on the seaweed [by the government].

5.2 We must protect our children, even if it takes evacuating them from the radiation contaminated areas.

Radiation sicknesses include: tardive cancer, leukemia, and genetic disorders. Moreover, statistics are already showing an increase in negative health effects. Whether or not these sicknesses are related to radiation exposure will be examined by long term epidemiological (health effects) studies. I expect that various kinds of illnesses will appear in the future, but because it will take dozens of years to prove that they stem from the Fukushima accident, it will be too late to take action then. Honestly, we should have stopped the nuclear plants already.

The best we can do under such hopeless conditions is to minimize the total radioactive exposure. Improving the radiation exposure environment for workers and cleanup crews at the power plant must be done immediately. Radiation exposure for children must also be minimized. We must scrape the contaminated soils at school grounds to keep them safe for children to play.

When I measured the plants and soils delivered to me from Fukushima, it showed unimaginably strong radiation. These are the soils and plants that children touch and live with daily. Now, children live in areas that should be

designated as radiation controlled areas. That such a situation has happened, is truly unbelievable.

At least, I really want to somehow separate those children from such contaminated areas. But if only children are relocated, it would lead to a collapse of their community. During the WWII, children would evacuate to rural regions. Now the situation in Fukushima is exactly like under the war. I think relocation of children might be an option only if the government can create places for children to go happily.

We have to decide immediately on the extent of the area from which children should be evacuated. The radiation exposure limit of 1 millisievert per year is only a tolerable level, not a safe one. I don't think that 1 millisievert per year is adequate, but we must follow the standard at the very least. However, provided the standard is followed, we might end up having to remove all the children from all over Fukushima.

Mr. Shun-ichi Yamashita, Fukushima radiation Health Risk management adviser, insisted that it is ok up to 100 millisieverts and that it is necessary to control all information [by the government because a flood of information confuses people]. I really want such a criminal to be sent to prison as soon as possible.

5.3 Adults who have countenanced nuclear power plants must take responsibility

There are questions such as, "Is it ok for adults to live in Fukushima [if not kids]?" or "Should the traffic networks through Fukushima be diverted?" The answers depend on the social judgement of how much risk [of radiation exposure] we have to endure.

Talk of the "average sensitivity" to radiation exposure is only relevant to people who are around 30 years old. The sensitivity to radiation exposure of an infant is a 4.5 times higher risk than the average. Even one is 30 years old, women should be careful. A sign in an X-ray room at a hospital says "It's closed to the public without permission other than the person concerned. Women who may become pregnant should inform a doctor." This contains an important message. In general when an adult man passes 30 years old, his sensitivity of radioactive exposure decreases. The effect on a man over 50 is not very serious and will be several tenths of the average. They are pretty insensitive to exposure.

However, men who want to have children in the future should limit their exposure. On the other hand, men over 50 are the ones who are the most responsible for Japan's nuclear energy policy. I believe they should accept such exposure.

To be fair, adults responsible for countenancing nuclear power should all live in the area and undergo exposure through the transportation system. The radioactive exposure should be minimized, but I am afraid that we cannot rob

the local people of Fukushima of their homeland.

Even people who are away from the heavily polluted land face the possibility of indirect exposure through the consumption of food. Tea from Shizuoka through Kanagawa is all contaminated. But if we reject those foods dosed with radiation, their agriculture would collapse. We must protect agriculture and fishing in Fukushima and the prefectures surrounding Fukushima.

The Japanese government advocated the policy that promoted locating nuclear power plant [in rural areas], but it has neglected putting effort into supporting agriculture and fishing. Based on this fact, I have always thought that the Japanese government must increase support for agriculture and fishing. The Fukushima accident could now trigger and accelerate decline toward collapse in agriculture and fishing industries. It is necessary for adults who have been supporting the government's nuclear policy, to support our agriculture and fishing by eating more and more polluted agricultural products. Although people in Osaka might think that it has nothing to do with them, I hope they think seriously about the future of Japan as a whole and adults accept agricultural products and sea food from Fukushima.

5.4 A massive amount of highly concentrated contaminated water is running into the ocean.

In seaweed collected 50 km away from the nuclear power plant, over 10,000 Bq (becquerels) of radioactive materials per kilogram were detected. This is a tremendous amount of pollution. From now on, I expect, a terrible amount of contamination will be found from seaweeds such as wakame and hijiki. I have always said that the best way to check the contamination of the ocean is to check seaweed. Because the seaweed cannot escape from where it is, it tells us the pollution status accurately. To check oceanic pollution, first check seaweed, then shellfish, and lastly fish. I have been wondering why the government does not disclose the data from seaweed. If they check fish first, the impact might look smaller.

The Fisheries Agency says that radioactive materials are not accumulating in fish. Marine biologists say that they are. Although I am not a marine biologist, I believe that radioactive materials must be stored in fish. The density of toxic materials in fish does not rise immediately after the accident because fish are migratory. Therefore, it is scientific for Green Peace to start monitoring seaweed first.

The Japanese government does not seem to have a positive impression of the research done by Green Peace. If they say so, then they must do it by themselves without goofing off on the job.

5.5 The government must disclose the oceanic pollution.

Is the pollution increasing? Not necessarily. It depends on the balance between the amount of radioactive material released and the metabolisms of the ocean organisms. However, it should be noted that because the huge volume of radioactive material that has been released, the contamination will continue for a very long time.

Once the result of the contamination study is released, many people won't want to eat seafood. It will lead to the collapse of the local fishery industry.

Currently they are building the silt protector outside of the No.1 reactor, but probably it is futile.

TEPCO announced that starting from June 2nd, they will start a new contaminated water purification system using zeolites which are the go-to clean up tool for radioactive water. I believe that vermiculite (soil improvement additive) would be more effective than zeolites.

Although it is a cheap and common soil improvement material, it is highly effective for absorbing cesium. Zeolites are better than nothing, but at any rate, neither method can catch all cesium because once those materials absorb a certain amount of cesium, it is no longer effective.

In April, the leaking of contaminated water into the sea was big news, but now no related news is reported. Does it mean that the outflows have stopped? I don't think so. Of course, everyday radioactive water is overflowing into the ocean. 90,000 tons of radioactive water has been built up in the trench, turbine buildings, and shafts which are all made out of concrete. Contaminated water has been leaking into the ground through the cracks of those concrete buildings that resulted from the earthquake. As a result, the toxic water certainly must have run into the ocean through underwater routes.

No data about the contamination is released because TEPCO does not collect any data. When they tried to stop the radioactive water in the pit, they could have calculated it by measuring the density. Now it is impossible to measure it because it is leaking through a way under the ground which is hidden. The radioactive water has to be removed from the trenches, under the ground, and in shafts as soon as possible.

It is supposed to be possible to do a fixed point observation on radioactive water from the sea but the government or TEPCO does not do it at all. It's ok to do it from offshore (or outside of the silt protector). It is necessary to do it daily. However TEPCO and the government neglect doing it. They do not want to admit that they release the toxic water into the sea. In short, they want to make the Fukushima accident damage look small.

5.6 One can expect little from TEPCO's plan

The biggest issue is how to treat the accumulated contaminated water. The danger-line for overflowing is finally coming very close. TEPCO said that the

purification treatment device will be completed around the 15th [June, 2011]. I wish it could come true but unfortunately so far any counterplans by TEPCO have never been met successfully.

TEPCO said that if this purification treatment device works as intended, a level of radioactivity can be thinned to a one 10,000th or one 100,000th. However, because the original concentration is extremely high, even if it turns out to be one 100,000th, it will be too contaminated to be expelled.

Unfortunately, there is no miraculous system that can make it that weak. Especially if the original density is very high, the more the device catches the radioactivity, the more it will be damaged, and its performance will degrade. I think that this time they plan to use zeolite or vermiculite, but it will deteriorate soon and cannot be used any more.

When zeolite absorbs a certain amount of cesium, it becomes saturated and ineffective. Therefore, it has to be replaced frequently. Moreover, because the spent zeolite itself will be contaminated, people cannot go close to it to replace it. Indeed, it is a difficult process.

The work to build the concrete block around the plant has not been touched. I think it should proceed in order to store the contaminated water. I had said before that we should build concrete walls because if the reactor core already melted down and it went underground, it cannot be cooled anymore. It would be better to build the walls rather than make the contaminated water overflow [by pouring water on the reactor core in vain]. However, if the contaminated water is already leaking, this kind of construction work would be difficult.

People have been paying attention to whether or not the purification system will be completed in time before the contaminated water overflows. However, the contaminated water is certainly running underground and into the ocean in invisible places. Because the concrete of the buildings is cracked everywhere, the contaminated water is leaking into the underground and the ocean. Now it must be pumped out of the turbine buildings, trench, and shaft pit. (Without this work, nothing can be done.) It does not matter if the purification system is completed in time by 15th [June, 2011].

Chapter 6

There is No Recovering the Melted-Down Nuclear Fuel— A Long Way From Convergence

Mr. Koide proposed his idea of displaying radiation contamination levels of food for the sake of protecting children's health. Like the Administration Commission of Motion Picture Code of Ethic labels movies as "Adults Only" or "No Minor Admitted" , food suppliers or public authority food should classifies as , for example, "good for over 60-year-olds" or "not good for 18-year-olds and under" according to degrees of contamination. In that way, he argues, the society should reduce internal radiation exposure for children as much as possible. This proposal is an extension of his argument that adults should eat radioactive polluted food from Fukushima because they share responsibility for allowing and accepting the building of nuclear plants. This is a very controversial argument, which got him the feedback of a lot of pros and cons.

This appeared on No. 1426 issue of Jimmin Shinbun ,on October 5, 2011.

Mr.Koide: At Three Mile Island accident, 50% of nuclear core melted, and it took eleven years to take out the melted core lying in the form of lava at the bottom of the pressure container. In the case of Fukushima it is supposed that the melted nuclear fuel dissolved and broke through the pressure containers and dropped down to the floors of the secondary containment vessels, or even through them to the basements of the reactor buildings that house both the pressure containers and the containment vessels. In that case, it is definitely impossible to recover the missing nuclear fuel. Neither TEPCO nor the government knows what to do with the situation.

What should we, as a nation who failed to prevent the nuclear accident from happening, learn from this tragedy ?

The first and foremost priority is “no more lies.” No to lie to oneself as well as others” This is because the whole thing began with the lies. They promoted nuclear energy plants by telling lies and we people accepted the lies, such lies as “nuclear plants are safe protected by high-tech” ,” no serious accidents will happen” and other myths.

6.1 No Choice but to Face Radioactivity as a Nation except Innocent Children

The forced evacuation areas are twice as large as Lake Biwa, and of course, it is the land where farming is impossible. But you find farmers lavishing care and labor on their fields in those areas that should be earmarked as the “radiation controlled zone” and the “emergency evacuation advisory zone.” It goes without saying that their crops are polluted, but as long as the farmers hang in there to keep plowing, tilling and growing in the face of radiation exposure, I have to say that we consumers should support them. There is a way to make TEPCO buy what the farmers produce, but TEPCO only throw away what they buy; throw away not only the crops, but also the farmers’ pride! The farmers produce crops to be eaten by people, not to be thrown away. It is necessary for the consumer public to support and cooperate with the farmers (and the fisherpeople) to protect the primary industry in Fukushima.

Of course nobody likes to eat radioactive contaminated food, but, under this changed and disastrous situation, people should develop the understanding that no food safe to eat exist anymore in Japan. We have no choice but face radioactivity in everyday life.

6.2 What to Do to Protect the Children

Radioactive materials, since they have been released from TEPCO’s reactor cores, belong to TEPCO. We would like to give them back to the company if we can ! It is, therefore, TEPCO’s duty to check where and how much and what kinds of radioactive substance are and make the findings known to the public. It is also TEPCO’s duty to conduct food inspection, besides buying up contaminated food, and the public of the findings. At least these two are their social responsibilities to perform, in addition to much and much more tasks they are obliged to do. There are independent individuals and groups measuring radiation dose, radiation distribution and radiation analysis. But what is socially more important is to try and make TEPCO and the government do these tasks under the strict public watch, that is, in the fully transparent context where no deviance occurs.

I think the highest priority be given to the protection of children. Just now the school lunch feeds the children of Fukushima highly contaminated food. Although you cannot find no polluted foodstuffs now, you should try to find as low contaminated food as possible for children. Well, I would like to offer

a suggestion . How about classifying and labelling every food as, say “not good for 18 year-old and younger” or “OK for 60 year-old and older” or “not good for women capable of pregnancy” or so on, according to degrees of contamination, just like movies are classified and labelled as “adults only” or “no minor admitted” in order to prevent mental contamination of the younger generation?

The generations that have built and accepted nuclear plants have the social obligation to accept nuclear exposure to a certain extent. Of course, it goes without saying the highest responsibility lies with TEPCO and the government. I would offer another arrangement; that is, serving the highest contaminated meals in TEPCO’s restaurant for high-ranking employees and the national government’s dining halls for Dietpersons and officials. At any rate, it is my idea and proposal that the adult should accept and eat contaminated food while leaving less contaminated safe food for children to eat. In this catastrophic situation, protection of the younger generation is all we can do.

The relation between exposure dose and health damage is clear. So the government shows such a tentative standard as “the annual dose limit of 100 mSv” which means that plant workers and local residents should tolerate that amount of exposure. The government tells people how far you can harm your health instead of how to guard your health! It is absurd that anyone else but yourself to decide the standard of sacrificing yourself. It is a matter of your own decision. What the government should do is to provide us with true, accurate and exact data and information so that we can use them as reference for our decision and choice in living in this changed world.

Chapter 7

Nothing has Changed in Nature about Japan and the Nuclear Energy Stakeholders' World since the Accident

I asked Mr. Koide to sum up briefly the year after the accident and his reply was “nothing has changed” except for destruction. The posse of the parties concerned with nuclear plants both politically and economically remains the same as before in spite of inviting the tremendous disaster. “Japan is an impossible society” he said.

The melted cores of Units 1, 2 and 3 are missing. In Unit 4, the spent fuel rod pool four floors above the reactor 4, hangs in the air. The building housing Unit 4 is buckling and sagging, threatening to collapse at any moment. If the pool packing 1,533 spent fuel rods in damaged racks should tumble down, “a catastrophe would reach an unimaginable level” said Mr. Koide.

In these days when the government and the nuclear industry are talking about resuming operation of the nuclear facilities which have been shut down for regular inspections, I interviewed Mr. Koide concerning 1) the present situation of Fukushima Daiichi Nuclear Power Station, 2) his view over what have been done during the past year after the accident, 3) any technology adaptable to render radioactivity harmless, 4) anti-nuclear movements now gaining steam among people. In this interview Mr. Koide expressed why he has been against the building and use of nuclear plants. According to it, nuclear plant business comes at the expense of underpopulated local communities for the good and interest of big cities and subcontract nuclear plant workers for the interest of the nuclear plant companies. The Fukushima accident revealed that Japanese nuclear power

plant is an industry systematically utilizing social and human discrimination.

This interview appeared in No. 1450 issue of the Jimmin Shinbun, June 15, 2012.

7.1 Missing Nuclear Fuel

— What is the situation of the crippled nuclear reactors like ?

Mr.Koide: In Units 1,2,3, the nuclear rods, which are melted down, passed through the pressure containers, and, most likely, also through them to the containment vessels, and again, out of them down to the basements of the buildings housing the both, and possibly out of the buildings to somewhere under the ground. Nobody knows exactly where the melted nuclear fuel lies, because you cannot enter the reactors to see where it is, nor any measuring instruments are not installed. I am afraid that some of the melted fuels may have broken through the concrete basements of the reactor buildings into the ground, where it is mingling with groundwater. In that case, a high density of radioactivity goes out with groundwater.

In May, 2011, I made a proposal of how to deal with the situation. I put forward of the idea of building the thick and wide walls down deep into the ground outside the reactor buildings to prevent polluted groundwater from spreading to other areas and to the sea. I am still offering the idea, but the fact remains that TEPCO is doing nothing like that.

The containment vessel is the last barrier to contain radioactivity, but those in Units 1,2,3 are broken and damaged somewhere, and that's why the hydrogen explosions happened. Hydrogen generated and accumulated in a chemical reaction of the contact of water with zirconium (coating material covering uranium) went out through holes or slits of the containment vessels, and on contact with the air (oxygen) ignited to explode. Yet since the containment vessels have not completely broken down, a lot of radioactivity still remains in them.

7.2 The Damaged Spent Fuel Pool on Upper Floor Of Unit 4

In the hydrogen explosions of Units 1,2,3, the uppermost part with a reactor crane of each building, commonly called as the “operation room” , has been blown off, but in the case of Unit 4, the lower level as well as the top has been blown off. In the lower level, on the second floor to be exact, lies the spent fuel pool where 1535 spent nuclear fuel rods are held in racks, that is, nuclear fuel lie naked without any protective barriers in the crumbling building. The nuclear material in the pool has radioactive energy equivalent of about 5000 Hiroshima-type atomic bombs.

After the big quake, a series of aftershocks, strong and weak, are still happening almost every day. If a powerful one should attack the plant again and

the remaining parts of the Unit 4 building should collapse, resulting damage and mess would be beyond my imagination. According to the government, the total volume of radioactive release since after the accident amounts to that equivalent of 160 Hiroshima-type atomic bombs, though I do not believe it, In my calculation it would be worth more than 400 bombs. In the pool of Unit 4, radioactive material worth 10 times of that exists bare and naked. Imagine what the world would become if the pool should fall down!

7.3 Unit 4 Will Withstand Another Earthquake, Says TEPCO

TEPCO was aware of the danger, too and they did a seismic strengthening works with Unit 4 last year. 32 steel columns 8 meters long were placed at the second floor where the pool lies and encased in concrete. Then TEPCO announced that the Unit 4 building was strong enough to withstand another big earthquake. But they strengthened right side of the pool. The floor under the pool still remains collapsed. As you see in the figure 1, the pool is supported only by the right side; they strengthened the pool only in part, that is, half of the pool. And as the works were carried out in the midst of radiation pollution that did not permit slow and steady work, I wonder if they did a reliable construction work.

In fact TEPCO seemed uneasy about the strengthening works. In April this year, they set to work on removing spent nuclear fuel rods from the pool to a safe pool. A spent fuel rod, as soon as it is taken out of the pool into the air, it releases fatal dose of strong radiation. The exposure of the rods to the atmosphere, therefore, has to be avoided at any cost. The expected procedure of operation would be as follows; 1) they send a transportation container made of iron and lead (cask) to the bottom of the pool so carefully and gently as not to hurt the rods in an accidental collision, 2) relocate the fuel rods stored in the rack inside the pool, one by one, into the cask underwater, 3) seal the cask, 4) lift up the cask from the pool, 5) lift down the cask to lay it on a trail-car, 5) and transport it to safe storage pool. As you easily see, to do the procedure mentioned above, they need a crane. But the crane and the operation room at the top of Unit 4 building have been blown off. And to prepare a crane and an operation room, they have to clear the site and the ground away first for the construction work. They have to 1) dismantle the old damaged No.4 building and the crippled crane, 2) clean away all the rubbles strewn all over the place, and 3) construct a new building and install a crane. After completing these preparatory works, they can set to the removal operation. The place is so highly polluted that the working conditions will be extremely bad. Even TEPCO admits that it will not be until at the end of 2013 that they can start the removal work.

— Did you notice any change on the part of the nuclear industry and the government in one year after the accident?

Mr.Koide: It is my honest feedback that there is no change in the nuclear power corporate culture and the government's nuclear policies in practice, despite the horrible calamities that are still going on. Now over one hundred thousand people are driven from their homes. How seriously do the corporation and the government take the weightiness of the fact 100,000 people had to move away from their familiar surroundings, isolated from the neighbors and friends, uprooted from their life? All that the government did with the nuclear disaster was to evacuate the locals from the super-intense radioactivity zones. But the residents near them, living in as much contaminated areas as the government-designated evacuation zones, are just left as they were; actually neglected or abandoned, I should say. "If you don't like living where you are living now, you are free to escape with self-responsibility" seems to be the government policy towards the victims on the whole. Some relatively rich families have left the ruined villages and towns and begun new lives elsewhere. Other families took their own defensive measure of moving mothers and children to safer places and husbands remaining in the polluted hometowns to continue their jobs. But vast majority of the residents, unable to escape for various and specific reasons of their own, remain in the polluted areas, in which they rear their children. Of course the parents are worried about the effects of radiation on their children and even blaming themselves for keeping them in the danger of contamination. The thought of it saddens me overwhelmingly, and the people who have sons and daughters all over Japan as well.

Not the nuclear power mafia (the nuclear power industry, its stakeholders and supporting politicians and pundits). As far as they are concerned, nothing has changed. In the face of the catastrophic situation, they still say "denuclearization will weaken the Japanese economy." I could not believe my own ears when I heard the statement. But it is the undeniable fact that those people stay in the center of Japan's economical and political mechanism, playing potent roles.

Prime minister Noda is undoubtedly prompting to resume operation at the nuclear facilities that are now in the resting phase for the regular periodic inspections. His predecessor, Naoto Kan, who was once a proponent of building more reactors but changed to take an anti-nuclear stance after the accident, would be against restarting nuclear power plants. But he was so unreliable that, even if he were still a prime minister, he would be subject to the powerful nuclear power mafia.

— There are some people who feel like to join the anti-nuclear power plant movement but cannot bring themselves to do it for some reasons. Will you give them encouraging words?

Mr.Koide: I don't think that they have to do it. As you know, I oppose the nuclear power plant, that is because I resist discrimination. As I explained before, the nuclear power industry establishes itself upon discrimination against local areas in favor of big cities and discrimination against subcontract workers in favor of regular employees. It comes at the expense of those in a weak position. My job is related to the nuclear power plant and I oppose discrimination, which led me to anti-nuclear power plant for one thing.

You don't have to be an anti-nuclear power plant activist specifically, but you should oppose any kind of discrimination that disgraces humanity. Then your anti-discrimination attitude will be connected to anti-nuclear power plant movement and other movements for social justice. In Fukushima 89 % of the workers hired in the plant were found to be unskilled and temporally hired subcontract workers. Japanese nuclear power plants do not work without the practice of systematically using these workers. Leave anti-nuclear power plant movement to me or those who like it, and try to do what you think is the most important in your social life. You don't have to blame yourself for not doing anti-nuclear power plant movement. Just do what is important in your life. Everything is connected, part of its entirety ,because, as the saying goes, "no man is an island".

Since March11 I have conducted a sequence of radiation measurements in various areas in Fukushima, published the results and insisted that those who share the biggest responsibility for Fukushima disaster should eat the highest radiation-contaminated food and those less responsible eat less contaminated food. But I am aware of a dilemma. When the results of my research on radiation-contaminated foods are published, it may follow that the rich buy clean and safe foods however expensive they are and eat them, while the poor , unable to afford to do so, eat cheap polluted foods. This goes against my insistence that the heavier your responsibility for Fukushima disaster is, the more intense radioactive food you should eat. But, at least, it helps to make clear another discrimination about the rich and the poor, which, I hope, will ignite another protest related to the nuclear power accident. People act when they see a contradiction, you know.

Anyway, publishing radiation dose of foods and lands and the atmospheres so that everyone can see which food or which place or anything else is how much contaminated and can make wise choices and decisions based on the knowledge is absolutely necessary.

I would like to voice a warning, though; not to rely on a politician in the attempt to change the world for the better, whatever ear-pleasing words that politician may say. Expecting a mayor, a governor or a premier to improve the society and rely on him or her blindly would do more harm than good. That is one of the most important lessons history has taught us. Each individual should see with his or her own eyes and think with his or her own brain and discuss together. Interdependence among people is better than dependence on political representatives.

7.4 Detoxifying Radioactivity Is Almost Impossible

— Please tell me about the study how to render radioactivity harmless. Does the study progress a little or not at all?

Mr.Koide: A nuclear power generation utilizes energy produced by ura-

niium fission. Heat from nuclear fission is used to raise steam, which runs through turbines, which, in turn, powers electrical generators. Nuclear fission also produces fission products. Basically uranium is the dangerous matter that radiates fatal radioactivity. That radioactivity increases in dose by a billion-fold instantaneously when uranium fissions. The human race has come to possess the fierce monster.

It was in 1942 when man began to use the chain reaction of nuclear fission. In that year the US, with a help from England and Canada, began Manhattan Project, a research and development project that produced the first nuclear weapon. Nuclear physicists tried to find how to produce plutonium, transuranic radioactive chemical element, whose cores, by the way, were in the atomic bomb (called the Fat Man bomb) dropped down over Nagasaki in August 1945. They found the way and concluded that producing plutonium in the nuclear reaction was the most effective way; in nuclear reactions some of the neutrons released by the fission process convert uranium nuclei into plutonium. Fission of a kilogram of plutonium produces an explosion equivalent to 21,000 tons of TNT. It is this awful amount of energy that makes plutonium important in nuclear weapons, and power generation reactor as well. So you see, the main object of nuclear research and development was, originally, the production of plutonium, not the generation of electric power. You must keep it in mind.

But they also found how dangerous plutonium is to handle. They learnt, for example, it, when exposed to the air, releases radioactivity fatal to human life and form damaging free radicals. So they began the study on how to detoxify nuclear materials as early as in 1942. It is 70 years since they began it, but they have not succeeded in their attempts yet.

I give you two reasons why they are failing in detoxifying efforts. 1) As I explained, nuclear fission is bound to produce fission products fatally harmful to us and the environment. To “eradicate” these fission products requires a lot of energy, almost the same amount of, or more than the energy they have built the nuclear power plants to acquire. The relation of output and input reverses and nuclear power generation itself becomes nonsensical. 2) I said “to eradicate” , but in fact this is not an adequate phrase; there is no eradicating radioactivity. What they have been trying to find is a way to transform long-lived fission products (half-life being over 200,000 years) to short-lived ones, so that making the everlastingly long-term storage and control of radioactive materials and waste into relatively shorter retention would become possible. But another irony is that procedures for changing long-lived radioactive materials to short-lived ones are bound to be accompanied by new chemical phenomena such as new kind of long-lived radioactive materials being created or non-radioactive materials being mutated to radioactive ones. Even Japan Atomic Energy Agency has been doing researches and experiments on detoxifying since long before, but they cannot overcome the walls I mentioned.

It is our generation that started this adventure in the nuclear power generation. The industry will last over the next decade or two (unless we become strong enough to stop it). But the next decade or two will be the limit, because uranium depletes. But the radioactive waste our generation has produced

remains active for over a million years, passing devastating legacy onto our future generations. This is one of the worst crimes we have committed against our children. I wish we could render what we produced harmless during our generation, but, alas, it is an impossible task to achieve.

7.5 Japanese Government Doing Deliberate “Go-Slows” ?

— WHO published the “health risk assessment from the nuclear accident, based on a preliminary estimation” in February 2013. Do you consider it reasonable and proper?

Mr.Koide: I cannot tell for sure if the details in it are correct or not. All I can tell is that it should have been Japanese government who published it instead of WHO. You know there are many governmental institutes and agencies in Japan. Why didn't they conduct their researches on pollution and its effects on us and publish the results at the early stage? I don't know whether the nuclear energy-related authorities deliberately shirk the duty to do it or simply are not capable of doing it. What I know is they are doing nothing. Perhaps that is why WHO got impatient and started the job themselves. What a shame!

It is hard to “assess” the validity of WHO's assessment. My intuition is that the health risk for the residents and workers must be greater than WHO's assessment, but I can't tell it for sure. It is because of the lack of data on nuclear contamination in the early stage of the accident. Data and information are not available to me, nor to the public. The government may keep the data hidden from the public, or maybe the nuclear energy-related authorities, unprepared for such a horrible accident, had no time to collect data on that.

In either case, the fact is that things went worse and worse while the authorities did nothing. Mr. Kan, the then Prime Minister, said “I didn't know what to do because there is no information coming from the scene of the accident nor from TEPCO.” I think this is the honest picture of the government revealed.

A day after the earthquake and tsunami, TEPCO inspectors found tellurium-132 which was the sign of reactor meltdown but kept the finding in secret for three months. And for several months after the accident, the government frequently announced flipp-flopped levels of contamination of school, causing confusion and fear about the safety of schoolchildren.

Whatever reined the government at the earliest stage of the accident, they could have made the pollution situation known to the public by gathering and collecting information and data from various sources. They still could do it still now if they would. WHO did it, and soon other international bodies will do it. That may press our government to do it, too.

The publication of pollution situation is important for the locals to make choices and decisions in their life and work.

Chapter 8

Our Way of Life Questioned

In this interview Mr. Koide reflected on Japan's modern history that forged ahead its path to the western-style modernization. And as a land mark to a new society for us to build, he referred to Ryuichi Matushita's An Ideology of Darkness: A Theory for Anti-Thermal Power Generation Movement (Matushita, 1937 2004, was a novelist/poet of peasant literature. The referred book was published in 1974). It is the land mark showing a way to replace industrialization and money making with rich natural environment and intimate human relationships. The land mark also shows a fundamental sense of direction towards a de-nuclear power society.

This interview appeared in No. 1471 issue of the Jimmin Shinbun, February 5, 2013.

8.1 Melted Cores Still Missing; Containment Vessels Full of Holes and Slits

— First, tell me the present situation of Fukushima.

Mr.Koide: Four nuclear power reactors were broken in Fukushima Daiichi Nuclear Power Station. Of the four, Units 1,2,3 had been in operation, and Unit 4 had been suspended for the regular checkup, not loaded with nuclear rod, though it had a storage of spent fuel in a water pool. In Units 1,2,3, radioactive fuel rods were found to have melted down to the floors of the pressure containers, and then the molten fuels, eroding the thick floors, left the pressure container vessels and “reached down to the floors of the containment vessels.” (TEPCO admitted) in substantial quantities. A containment vessel is the last barrier against radioactive leakage. Do the melted fuels stop there or do they go out ? Nobody knows. There is no knowing what has become of the melted nuclear materials, because you cannot enter the inside the fatally polluted buildings. TEPCO said it would conduct an investigation of reactor containment vessels using robots, They attempted photographic intelligence by using robots. But

many of the robot assigned the mission did not return, with electronic devices installed in robots failing to work owing to the effect of dense radioactivity, and with a mountain of wreckage and rubbles blocking robots from working.

TEPCO also began to use remnants of the measurement equipments to locate the molten cores, but since TEPCO had not expected such a big disaster as this to happen, they have no measuring instruments appropriate to the situation ready. They use various detectors for normal operation, but even they are being damaged and going out of order owing to radioactivity and heated steam. They are losing sensor-acquired information day by day. That is the dominant situation even now, in which the workers are struggling.

The floors of the containment vessels are made of concrete 1 meter in thickness. TEPCO announced “the melted fuels have eroded the concrete floor to a depth of 76cm, but are now stopping there, which means nuclear fuels are still contained inside the vessels.” But did not announce the fact that the vessels supposed to contain nuclear fuels are full of holes and slits. The fact that water poured in the containment vessels leak soon without remaining inside proves that the vessels are severely damaged. Despite the announcement, we must conclude the last barriers (containment vessels) have been broken, allowing radioactive leakage.

Actually I should say that the melted cores may have passed through the floors of the containment vessels to be somewhere in the ground underneath, while some may remain in the vessels, leaking radioactivity through holes and slits out to the air and denying human entry for inspection. In that case, they would come out into the sea sooner or later. There would no stopping spread of radioactive contamination. That is why, anticipating the worst, as early as in May 2100, I made a proposal for “building wide steel-iron barriers underground around the nuclear reactor buildings before the cores melt down in to the ground.” But TEPCO has done nothing of the sort yet As to the atmosphere on the ground, TEPCO published the other day that 10 million Bq per hour of radioactivity are escaping in to the atmosphere. This value suggest that the radioactive leakage has dramatically decreased compared to the amount of the becquerel released during 2 weeks after the accident.

8.2 Concern about Criticality in Unit 4 with Spent Fuel Pool; Extreme Difficulties to Remove the Rods from the Pool

Unlike Units 1,2,3, Unit 4 escaped nuclear melt-down because it had been shut down for checkups, replacement of shroud and refueling when the earthquake assaulted. It has, however, a spent fuel pool on the upper floor of the reactor building. The total dose of radioactivity coming from the spent fuel rods stored in the pool is, even to put it mildly, equivalent to that of ten thousand Big Boys(atomic bomb dropped over Hiroshima).That is why fire engine brigades and detached units from the Self Defense Forces have been frantically pouring

a large amount of water over Unit 4, sometimes using helicopters to drop over it. It is a desperate attempt to keep the dangerous pool from going wrong by cooling and cooling. The pool itself was not damaged by the earthquake fortunately, but the situation in which the pool was placed is by no means safe. The building has been crippled by the earthquake and the hydrogen explosion and fires and are in a very bad shape; some exterior walls are out of upright and various parts of the building are badly crushed on two sides, so that the pool, as it were, hangs in midair.

TEPCO, uneasy about it, set out to do an emergency reinforcement work with Unit 4 soon after the accident. It was a crash work in the radiation exposure environment. It ended up a half-baked reinforcement, leaving the half-part of the pool still hanging in the air. If a big afterquake should bring it down, incommensurable quantity of radioactivity, unknown to the human history, would prevail in the world. Yet, TEPCO noted the building was safe, strong enough to withstand another earthquake.

In the preparation for an operation of removing nuclear fuel rods from the pool, TEPCO is now constructing a new Unit 4 building with cranes installed, replacing the old crippled one. At present they are in the phase of clearing away pillars, walls and debris at the upper floors above the pool. The construction work, though a little bit safer than those at Units 1,2,3, is a harsh work in radioactive exposure.

1535 nuclear fuel rods are stored in the pool, 1331 of which are used ones and 204 of which are new. The unused nuclear fuel rod's radioactivity is so low-level that you can touch it with your hand all right. In July 2012, TEPCO did a removal of unused fuel rods operation on a trial basis. They did it successfully thanks to the low-level of the nuclear fuel rods. But when it comes to spent fuel rods, which will emit fatal dose of radioactivity enough to kill people nearby instantaneously, the moment they are out of the pool water to contact the air. So they would put a big "cask" weighing 100 tons to the bottom of the pool, transfer the rods one by one into the cask in water, seal it tight, and take out the cask from the pool to move to a safer place. In order to do this operation, first they have to clear the interior of the pool where a lot of debris and rubbles are scattered. If a rod is crooked or distorted, not straight, it would be very difficult and risky to hook it up and move it into the cask. In case a rod should drop and hurt not only itself but also other rods, a horrible amount of radioactivity would go out, causing an awful calamity. Hooking 1331 spent fuel rods one by one and putting them into the cask safe and perfect will be a long, difficult, extremely risky and sensitive work. It is beyond my imagination, but I wish they would succeed.

8.3 Pursuit of Executive Responsibility before Electric Rate Hike

— Kansai Electric Power Co.(KEPCO), whose rate of dependence on nuclear power in electric generation is the highest in Japan, applies for electric rate hike.

Mr.Koide: Absurd ! Look at KEPCO’s annual financial report. It shows that the nuclear power generation is much more costlier for the company than any other power production means. If the company wants to raise electricity price on the ground of its financial difficulties, the top management should take on responsibility for having chosen the costliest generation method; it is their mismanagement. Moreover, TEPCO’s Fukushima nuclear plant accident highlighted the danger of the nuclear power generation, inviting a social atmosphere which will not allow the operation of nuclear power plants. As you know, all of KEPCO’s nuclear plants are in shutdown for periodic checkups and waiting for the permission to restart. If anti-nuclear power movement grows strong enough to influence the government energy policy towards non or less ?reliance on the nuclear power, KEPCO’s nuclear power generation facilities, which are now positive assets, will turn to be negative assets, worthless debt for business investment, the company have to keep paying for KEPCO may go bankrupt. It goes without saying the top management will be blamed for the bankruptcy. They should apologize for having investing in the dangerous and dehumanizing nuclear power generation and resign. Everything will go afresh after their resignation.

Instead of doing what I mentioned now, the top management of KEPCO dis never repent and apologize for their offences. Far from it, they threaten the public by declaring “unless you agree to re-starting now-dormant nuclear power plants, you will have to pay more money for electric service.” They are rather gangsters than business managers. A true manager would take responsibility for creating financial trouble for the company he runs before applying for a hike in charge.

8.4 Two Conditions for the Proposed Debris Disposal over a Wide Area

— The Ministry of the Environment has proposed the wide-area disposal of disaster debris. Environmental minister Hosono claims he is doing the people “share the pain,” and our city, Osaka, agrees to accept the wastes

Debris and rubbles from the devastated areas for disposal in the city, maybe for incineration or burial, I don’t know. Is this an act of humanity or just a spread of radioactivity?

Mr.Koide: “Render unto Caesar things that are Caesar’s” is a fundamental rule as far as the disposal of radioactive wastes is concerned; that is, 1)disposal of nuclear wastes in the very place where they were generated, 2)disposal of them after making them as compactible as possible, 3) disposal of them after

they are contained in a sealed vessels alone, not together with other wastes. Unfortunately, extensive regions have already been polluted, but it is a foolish act to spread polluted areas artificially. Basically this is what I'd like to say about the government's plan of wide-area disposal of disaster debris.

But when it comes to doing something to reduce radioactive exposure from Fukushima children, it is another story. Now the government, either local or central, is just letting the children live in disaster debris and radioactive affected environment, They should have constructed at the disaster site a kind of purpose-built facilities for disposal of radioactive wastes , containing as much radioactivity as possible in them. But they did not do anything of the sort and let things slide, thus keeping the children exposed to radiation. So I consider it permissible to distribute disaster debris elsewhere for purpose of saving Fukushima children from radioactive pollution. But, only under two conditions. 1) Incineration facilities in prefectures or cities that accept the disposal of Fukushima wastes should be equipped with radiation tracking-acquisition gears (special filters) so that radioactive materials should not fly away from the incinerators. 2) Concerning the disposal of ashes from incinerating contaminated garbage and sludge, make it sure that they are gathered in one place from all over the country and are returned to TEPCO on the government's own responsibility, instead of the present policy to entrust a local government with the final disposal of ashes from contaminated wastes. The mayor of Osaka city, for example, says that he will use the ashes in a reclamation work in Osaka Bay Area Development Plan. He should not do such a thing, and we must stop him from doing such a foolish act.

I said the radioactive ashes be returned to TEPCO, but to which place of TEPCO's facilities? Essentially to the Fukushima No 1 Nuclear Power Plant where they originated. But, in actuality, there are a lot of workers laboring there under the horrible radiation exposure environment. You cannot increase risks and agonies more for the workers by bringing the toxic ashes there. If they let me choose the final disposal sites, I would suggest, first, TEPCO chairman's gorgeous office, second, the president's, and then management directors' rooms to be filled with toxic ashes. Now, to be more realistic, the Fukushima No 2 Nuclear Power Plant is a good candidate. TEPCO plans to restart it impudently, but it should be a garbage can for the radioactive wastes TEPCO has produced. Greedy and shameless TEPCO, depriving more than hundred thousand people of their hometowns and pushing them in the depths of extreme agonies, tries to survive egoistically and would like to resume re-operation of the No 2 plant. No! Let's make TEPCO take responsibility for the nuclear disaster. To turn the Fukushima No 2 plant to a dumping ground for their nuclear wastes is one form of taking responsibility.

So I would agree to a wide-area disposal plan on the two conditions I just mentioned.

8.5 The “New Safety Requirements” Justifying the Resumption of Nuclear Plant Operation before Finding Causes and Factors for Fukushima Disaster

— What do you think of the “new safety requirements” the Nuclear Regulation Authority(NRA) issued?

Mr.Koide: The government ushered in the new safety standards for nuclear power stations. Needless to say, its stated reason is “to prevent another disaster like the Fukushima No 1 nuclear power plant accident.” But causes for the disaster and how the facilities and devices went wrong in the earthquake and tsunamis are still unknown. Nobody can go in the reactor buildings for inspection and investigation. Nobody knows what parts of the buildings, the pressure containers and the containment vessels are broken, nor where the melted reactor cores have gone. Nobody knows why the nuclear reactors have got broken. Was it the earthquake or the tsunamis or other causes that crippled the reactors? Nobody has any answers for the question. In that ignorance, how could they draw up the new “standards” for atomic power generation facilities?

The verification and validation process in the accident probe will take more than ten years, during which forming any criteria for restarting nuclear power plants is naturally impossible; to do so is like flying in the face of common sense. But NRA did. As you see, issuing the new standards will give the general public an illusion that safe operation of nuclear power plants is possible when they meet the standards. It is a fraudulent trick, for anyone of reason can see that it is impossible to make safety requirements without knowing what caused the Fukushima Plant boastful of safety myth to crumble down. But NRA did make safety standards. Because NRA is also a member of the nuclear power mafia. All the NRA executives, researchers, engineers and staffs are pro-nuclear power generation and deeply linked to commercial nuclear power generation companies. For example, it was leaked the other day that a staff of NRA secretariat handed some documents to the Japan Atomic Power Co. by the back door. This kind of irregularities is a common practice. That is why the phrase “nuclear power energy irregularity” and “nuclear energy mafia” (the world composed of nuclear power business, central and local government bureaucrats, researchers and engineers paid by nuclear power business) have been coined by the mass media to express the shadowy world of the nuclear power related business. The world has survived Fukushima.

Nuclear power generation facilities are gigantic, delicate and complicated assemblies of machines, inherently involving a lot of factors for failures and incidents; having intrinsic instability. The human race has had four major experiences of reactor meltdown. 1) The meltdown of a plutonium-breeding reactor at Windscale facility in England, 1957(UK was engaged in producing nuclear bombs there, not electricity)., 2) Three Miles Island Nuclear Power Plant accident in USA, 1979, 3) nuclear meltdown at Chernobyl in USSR, 1986,

and 4) our Fukushima disaster, 2011.

Fukushima nuclear accident was triggered by the earthquake and tsunamis, but the other three took place in no relation with natural disasters. They also were so big and awful accidents that none could foresee. If a fifth should happen, it may be caused by quite a different factor unforeseeable. Such is the case with machines in general. There is no telling when and where and how machines go wrong. Even when a nuclear power plant meets NRA's new standards, it is foolish to expect the safe operation of it. The new standards are nothing but a ritual procedure for restarting the now dormant nuclear reactors.

8.6 A New Society to be Built: Now is the Time for “an Ideology of Darkness”

— You published a book titled Now is the Time for “an Ideology of Darkness.” Please tell me about it. **Mr.Koide:** Japan, a small nation at the periphery of Asia, has grown up to be a modern aggressive nation, armed with a lot of deadly weapon and a lot of high-tech facilities to produce and consume a vast amount of energy, through taking the after Western physical civilization to modernize itself. Japan has made desperate efforts to be a big power relying solely on the Western science and technology. That was a wrong way to take from the very beginning.

It has dashed onward on this wrong way to industrialization at the expense of agriculture, fishery, human communities and ecology in general. Mr. Ryuichi Matushita, author of “an ideology of darkness”, stood against the crazy industrialization and dedicated his whole life to struggles against coastal reclamation, power plant construction, building roads and highways, industrial complexes, and air-port/sea port construction., Along with the social movements, he developed his philosophy which warned about the danger of the Japanese society, blindly dependent on industrialization and shutting the eyes to nature, human communities and harmony between the two being destroyed, and only being bent on making money. He said that making money was becoming a supreme morality, almost God in the society. He was a forerunner in this field. I respect him.

So discussing and trying to find what society to build in the future is a very important theme in anti-nuclear power generation movements. It is not just the question of what to do with alternative energy sources or what to do with economic growth, but we must rise higher than that level to the question of changing our way of life. We should be aware that Fukushima is calling us to account for our modern materialistically obsessed life. Our fetishism, our quality of life, is questioned.



Chapter 9

The Accident Beyond Human Control

The following interview took place a little over two years after the Fukushima nuclear disaster when people were beginning a little bit to get used to Fukushima. NRA, taking advantage of the trend of Fukushima settling into a kind of routine, was preparing for restarting the nuclear power plants that had been out of operation for the regular checkups, by issuing the “new standards.” Mr. Koide opposed the resuming operation of the dormant nuclear power plants, by pointing at an unresolved danger of Unit 4, still unclear causes for the accident (what exactly happened in the nuclear power generation machines at the time of the earthquake and the tsunamis accompanying it), despite of the fact that the then prime minister Noda promised thorough investigations to do in order to find causes for the nuclear accident at the UN assembly in September, 2011, and ignorance on whereabouts of the melted-down nuclear fuels. TEPCO’s robotically-applied recovery efforts do not seem to go anywhere. In spite of these situations, they are talking about re-operation of nuclear power plants.

Mr. Koide emphatically reminded us of the undeniable fact that “the accident beyond the human control has happened.” He warned against the general public’s sense of uneasiness over nuclear power being dulled somehow, which came partly from inurement but mostly from the disinformation and propaganda. For example, the above-mentioned Noda declared an end to the nuclear crisis by saying “the reactors are stable, which should resolve one big cause of concern for us all” as early as in December 2011. As for the present pro-nuclear power Prime Minister Abe, he is fuller of crap than Noda.

This interview was on No.1481 issue of the Jimmin Shinbun, May 15, 2013
— Tell me first about leaking of radiation-tainted water and its effect.

Mr.Koide: They have been pouring water into the reactors of Units 1,2,3 for more than two years without a break in order for the melted-down cores not to be melted further. But as I explained time and time again, melted cores have passed through not only the floors of the steel pressure containers and of

the containments vessels, but also some of them leaked through the basements of reactor buildings 1,2,3. They have spread all over the place. Thus they have kept pouring water to cool them. The water discharged filled the basements of the reactor buildings and of the turbine buildings, overflowing outside into the ground. This has lasted over two years.

TEPCO made a plan to reuse the overflowing water as coolant after cleaning it up. But as the waste water is too large in amount and is not under TEPCO's control, I doubt if the plan will go well. Polluted water is coming out from everywhere unknown to TEPCO; from holes and slits of the reactor buildings, of the turbine buildings, the trenches, the pits, etc. It has increased to 400 500tons a day in amount.

TEPCO tried to store the overflowed waste water in the tanks they hastily built on the premise, but could not catch up an increasing amount of water. Then, they dug pools, spread out liner sheets over the bottoms of the pools, and let the overflowed water into them. But the pools had leaks, too.

Poor performance, indeed! Their bodge job, however, explains how badly contaminated the accident area is. If it had not been for radiation, they could have done things right. Every work has to be carried out in terrific radiation exposure circumstances. Ever I, who am engaged in radiation by trade, don't want to go near the place. Fukushima is such a ferocious polluted zone. There, radioactive-contaminated water is overflowing, making its way to the sea. I am afraid that someday TEPCO will surely dump the polluted water into the sea on purpose, or they might have done so several times already in secret.

I am still of the opinion that they should build a wide underground wall around each Unit building to stop the leaking radioactive water from contacting groundwater.

9.1 ALPS: a New Purification System

— How much does water decrease in radiation level after being cleaned up ?

Mr.Koide: What is now being cleaned up is on Cesium; other radioactive nuclides discharged from the reactors are not being treated at all. For example, a concentration of 290 thousand Bq/cc of Strontium was detected in the site, the level being millions times higher than the legal concentration standard. A high concentration of Strontium was also found the area far from the plant in Fukushima. This raised serious concerns that leaked radioactivity may have spread farther than TEPCO and the government had expected. 120 tonnes of waste water which, TEPCO admitted, overflowed contain 35 trillion Bq of radioactive nuclides, almost equal to a third of the 89 trillion radiation dose the Hiroshima atomic bomb had released.

In order to remove most of the radioactive materials in treating the contaminated water, TEPCO has decided to introduce and use a multi-nuclide removal facility called ALPS (Advanced Liquid Processing System). This is the system which treats the treated water from which Cesium and Strontium have been already reduced to a certain extent to remove the tow nuclides further and other

ones for the sake of risk reduction. To be honest, I don't know far they can purify the waste water from various radioactive materials. With respect to each individual radioactive material, the law specifies how much of it is permissible to be released into the environment from a nuclear power plant. I wonder if they will be able to reduce radiation dose to the level legally stipulated.

Supposing they are able to remove most of the radioactive materials eventually, they can do nothing about Tritium, which is a radioactive isotope of hydrogen and therefore becomes unified with water. It turns to water itself. ALPS treats water by removing radioactive materials from water except Tritium, which is water itself and so cannot be removed. Eventually TEPCO will discharge the ALPS treated water, full of radiation, far beyond the legal release limit of Tritium, into the sea. It is said that 400,000 tonnes of contaminated water stored in the tanks contain about 817 trillion Bq of Tritium and that the amount of Tritium in the contaminated water is increasing by 230 trillion Bq per year.

9.2 Recovery Work in Unimaginable Contamination Environment

— What are the work environments around the nuclear reactor buildings like?

Mr.Koide: As you know, I work at Kyoto University Research Reactor Institute. When I deal with radioactive materials, I must do the job in the radiation controlled section, a special off-limits zone. You can freely enter an area with radiation dosage of under 0.6 microsieverts/hour, but the law specifies the place with radiation dosage of over 0.6 microsieverts/hour as the radioactive controlled area where only qualified experts are permitted to enter, with the full protective provision against radiation, of course.

Sometimes I have to do a research work in a place with over 20 microsieverts / hour in radiation dosage. Such a place is designated as a "high-dose region where many and various limitations and requirements are imposed on those who have to work inside, such as time restriction, no food-eating, perfect disposal of everything they wear, etc.

About a month ago, two rats were found dead inside the voltage transformer box. They died of electricity shock causing electric power interruption. The cooling of the unit had to be halted for a few hours in order to remove the dead rats. It was the third time that the cooling equipment was forced to go off line due to rat problems. Around the voltage transformer box 300 microsieverts of radiation are flying about. TEPCO had had to do the recovery work in that contamination environment. They had built the cooling water system with pumps to flow and circulate water, and of course a voltage transformer box for distribution of electricity to the system. They had had to install these devices at the crippled nuclear reactor building in that fierce level of contamination. They loaded the voltage transformation box on a truck, parked by the building, put it down at a nearby site, and hastily left; that's what they must have done.

They had no time to assemble the voltage transformer box on the ground and to make sure that no trouble would occur with the box. In that contamination environment almost all recovery works on the ground inevitably become “bodge job” .

By the way, the rodent trouble gave rise to a feeling of anxiety among the local residents that contaminated rats might spread radioactivity in the area, but TEPCO nor the local government did nothing about it.

The 300 microsieverts/hour of radiation forms a ferocious contamination environment, but other places are much more ferociously polluted. TEPCO might have thought the 300 microsieverts/hour a “tolerable situation” compared to the other, so decided to choose the place for setting the box. But who had to work in that “tolerable situation ? Certainly not the decision makers of TEPCO!

All over the plant premise, there are many areas contaminated so strong that man can hardly go near, including the reactor buildings where even robotic tasks frequently meet failures and difficulties. People often accuse TEPCO for not doing the recovery work more swiftly. I am not on the side of TEPCO, but the situation is so bad that TEPCO cannot do anything properly.

9.3 The Explosion of Unit 4 Caused by Ignition of Hydrogen Coming from Unit 3

— The spent nuclear fuels pool of Unit 4 is still threatening. dxplain the situation, please. **Mr.Koide:** The reactor of Unit 4 was being shut down for the periodical checkup at the time of the earthquake and tsunamis. I think 548 fuel assemblies at the core had been consumed only halfway and the other 600 were all spent fuel rods. All the fuel rods had been transferred to the spent fuel pool on an upper floor of the reactor building.

It is spent nuclear fuel that yields the danger of high radioactive intensity. Among radioactive nuclides, cesium-137 is the most toxic of all. Its radiation dose, in my rough estimate, turns to be equivalent to that of 14 thousand Hiroshima atomic bombs. Cesium-137 at the Fukushima Daiichi plant was found to be 85 times greater than at Chernobyl.

Why did the explosion occur at the Unit 4 reactor which was being shut down? I think it was a hydrogen explosion. Like TEPCO's explanation, the hydrogen generated in Unit 3 flowed through the common duct to Unit 4, where it was ignited to cause the explosion.

The nuclear containment vessel of Unit 3, as well as Unit 1, seriously damaged, were belching a lot of hydrogen. Hydrogen, lighter than the air, went up collecting at the top floor and exploded. That is why the highest floors of the both Unit buildings were blasted off.

But in the case of Unit 4, due to the hydrogen there coming from through the common duct from Unit 3, accumulated not only at the top floor but also at the under-floors, the explosion occurred in the middle part of the structure, so the side-walls and pillars that had supported the pool were blasted off in it. As a result the pool became, as it were, to be dangling in the air.

TEPCO, aware of an immense catastrophe taking place if the pool should collapse in another earthquake, as you know, afterquakes were still continuing, began to install a supporting structure for the pool. They put a set of steel beams on the floor below the floor of the pool and concreted them. But as the floor itself was damaged, the steel beams on it are, in fact, of no use. The pool is supported only by the concrete wall just outside the containment vessel, that is, the spent fuel pool storing the dangerous nuclear fuel rods in it is being supported only partially. The danger of the pool falling down at any moment still exists.

9.4 The Disaster Situation Not Grasped by TEPCO

TEPCO insists that the reinforced Unit 4 building would withstand an earthquake with intensity 6, but it is wise of you not to believe it. The fact is they don't know how far damaged and crippled the Unit 4 building is. How can

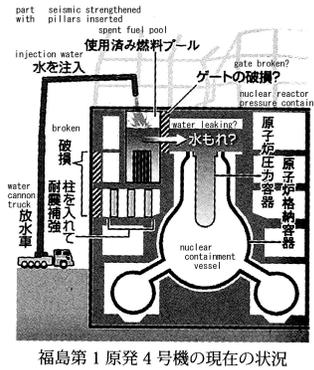


Figure of the present situation of Unit 4

they say it will be all right for another earthquake without the knowledge? If a possible breakdown that might occur at a next earthquake were such a minor damage as a few cracks in the wall of the pool, they could save the nuclear materials from melting by putting water into the pool. But if an earthquake were big enough to collapse the pool down, the resultant catastrophe would be beyond imagination, what with cesium-137 equivalent to a fusion of 14 thousand Hiroshima-type atomic bombs, what with no available barriers to contain radiation, and what with affecting the common spent fuel pool containing 6375 fuel rods located only 50 meters from Unit 4.

— Can we expect some progress in the recovery work using robots?

Mr.Koide: Robotic observation /operation is needed in areas which forbid the human entry. But even robots frequently become dysfunctional in that ferocious contaminated environments. The electronic circuitry that forms the brain of a robot is damaged by strong radiation.

After all, what a robot can do is very limited. The use of robots is well-known in the automobile factory, but it is applied in a field where the job is very fixed and routine and the parts used are also very routinely standardized. You cannot use robots in a work having to be carried on in an environment unknown to you.

For example, in Unit 3, they are doing the recovery work of carrying rubbles out of the broken nuclear reactor building. They found it impossible to use robots in the work, so human workers are doing the job by remote control of the heavy machine and cameras.

Chapter 10

Cleanup of Neighboring Areas: “Decontamination” is a mere “Moving Contamination”

They have launched a large scale of decontamination work in Fukushima prefecture, but it has been hampered by the enormous volume of radioactive wastes to be removed, the lack of adequate storage facilities and suspicion on the invalidity of the cleaning work itself. Since then the tide of opinion that TEPCO has no competence nor experience to deal with the disaster has grown among people. But Mr. Koide said that not only TEPCO but also any nuclear science experts are incapable of cope effectively with the disastrous situations. “I myself don’t know how to go about it,” he added.

Mr. Koide’s eyes are always directed towards children and workers in the contaminated environments, so he insists on cleanup for them even if its effect is limited. What to do in order to protect their life and health; this is the view point TEPCO and the government lack.

This interview was on No.1482 issue of the Jimmin Shinbun, May 25, 2013
— Does a decontamination work make a difference? How do they try to decrease contamination risks the workers are facing daily?

Mr.Koide: I must say decontamination itself is a mission impossible. The Japanese phrase “josen” (cleaning of wastes and dirt) is composed of “jo” (meaning “clean”) and “sen” (meaning “dirt” , “pollution” or “wastes”). But “sen” in this case refers to nuclear materials, which are impossible to clean; they don’t go out. So what they are doing in the name of “josen” (decontamination) is merely moving the radioactive materials without eliminating them. But the climate changes. When it rains, the radioactive materials removed, say from roads to mountainsides, flows out with the rainwater to come back. When it is

windy they come back with the wind.

Yet, as you know, I have been one of the advocates of decontamination since just after the accident. That is because children are most susceptible to radioactive damages and their protection were and are urgent. I insisted that school grounds, play lots in kindergartens and local parks where children spend a lot of time should be cleaned up first of all. Since the effect of cleanup is temporary and limited, as I explained, decontamination works have to be repeated so that we should protect the health of our next generation.

The next question is where to move the radioactive wastes to be stored. Now they are putting the collected wastes in flexible container bags, which they are just piling over temporary storage spaces. The spaces, however, will be filled up soon.

The government plans to build an interim intensive storage facility for Fukushima's radioactive wastes in each prefecture all over Japan. One for each prefecture, "sharing misfortune" they say. But it is apparent that the "interim" will become the "permanent" in effect. There may appear a local government or two or more that will accept the central government's plan at the risk of their prefectural residents' health. I do not want any local autonomy will do so.

The radioactive rubbles, dirt and dust that are spreading and drifting in the broad environment were originally in the nuclear cores of TEPCO's Fukushima Daiichi (NO.1) Nuclear Power Generation Plant. They belong to TEPCO. The cleanup work is, as it is, a collection of the garbages TEPCO littered the neighborhood with. Naturally we should return the wastes to TEPCO. "Render unto Caesar things that are Caesar's".

But the site of TEPCO's Fukushima plant is a ferociously severe contaminated environment in which innocent workers are laboring day and night struggling against radiation exposure for their life. We should not impose additional amount of radiation on the workers by returning the waste to TEPCO's plant. The first idea that occurred to me was to return the whole radioactive wastes to the corporate head office building in Tokyo. It is unrealistic, though. Therefore, I propose the Fukushima Daini (No.2) Nuclear Power Generation Plant for a second best candidate site. This is a more realistic and feasible proposal and saves municipalities from shouldering a burden of embracing the risk of radiation pollution. The site of No. 2 plant is very wide and spacious.

The Fukushima No.2 Plant has four nuclear reactors, all in shutdown condition now, and TEPCO wants to resume operation at the plant. Simply out of the question! TEPCO, who has plunged the local residents to the depth of misery with lots of lies, frauds and mismanagements, should have no way to seek its own advantage and profits by reoperation of the plant!

10.1 Poor Provisions for the Safety of Exposed Workers

— What are the working condition at the plant like? Does TEPCO take adequate measures for protecting the workers from contamination?

Mr.Koide: I am a radiation professional and anyone engaged in the job related to radiation like me must wear a glass badge (dosimeter) to be always aware of his or her personal dosimetry. But in the disaster site TEPCO don't know how many people are working, where they are working, what they are doing, under what conditions they are doing their jobs. All TEPCO does is just contracting-out with a subcontractor; a job commission. They contract out some recovery jobs to a subcontractor, who (called the first subcontractor), in turn, puts the job or part of it to another subcontractor(called sus-sub contractor or the second subcontractor, and the latter to another (the third subcontractor) and so on. Thus the job commission goes down the long list of subcontractors to dubious companies infiltrated by organized crime, whose labor sharks scrape up day-laborers from somewhere. Glass badges are not distributed to these day-laborers. No adequate protective provisions for their safety are not arranged.

I'll give you one example. A subcontractor ordered the workers to cover their dosimeters with lead plates in order to keep radiation doses low enough for the workers to continue working under dangerous conditions. This ugly act of dishonesty is only a tip of the iceberg. Some workers are forced to work exposed to many and many times the dose limit without dosimeters.

Now, nothing could be more tragic than the fact that the workers themselves want to work without dosimeters. There is the regulation forbidding a worker whose total dose exceeds 100mSv from working at the nuclear disaster site. The day laborers collected there are mainly destitute people from shanty towns in big cities like Osaka, Tokyo and Yokohama. They have to work in order to survive even if their exposure doses are enormous and even if they know their employers take a considerable amount of kickback from their wages. That is why they try to fake their exposure doses looking smaller. They put their life in peril to survive. This is one of the saddest realities of Fukushima.

10.2 Nuclear Core Recovery Impossible?

— Even IAEA (International Atomic Energy Agency) views TEPCO's nuclear decommissioning work and ways of accident response with skepticism. Let me hear your view.

Mr.Koide: If I had had the full power for responding the accident, I might have come out with measures for it different from those taken by TEPCO and the government. For example, I would have built an underground walls or barriers that would stop radioactive leakage just right after the accident. And I might have implemented my plan for the radioactive water to be brought into the Kashiwazaki-Kariya Nuclear Plant by using oil tankers, where the polluted water would be treated with the nuclear cleanup system. However, what I might

have done don't matter much nor would contribute a great deal to solving the problem, because the situation on the ground is so formidable.

The melted cores are still missing and none can go in to locate them. Even robots cannot work well in the intensive radioactive contamination environment. The situation on the ground is so formidable that it rejects anyone's advances, including me, IAEA, and whoever. TEPCO's lack of capacity to be the chief responsible party for the recovery operation is too apparent, but almost the same can be said with nuclear scholars.

TEPCO knows very little about radiation and nuclear cores. Their Fukushima No.1 Plant had been designed, constructed and run in conjunction with the US General Electric via Japanese companies Toshiba and Hitachi. TEPCO rely on these corporations as far as the decommission of the plant, and asto cleanup of the wreckage they rely on major construction companies like Kajima. All of them are doing their best, I believe, but their efforts have always been hampered by one difficulty after another.

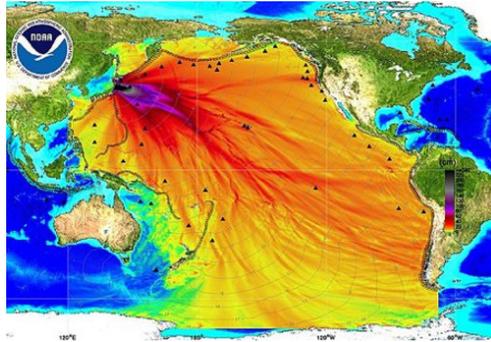
You see, all of them are unexperienced and ignorant amateurs in the context of this unprecedented disaster. None has the needed expertise to do the job right.

There is another factor you must keep in mind. Traditionally the practice of Japanese nuclear power generation plants has been systematically using unskilled workers under unstable working condition. You might say the whole business is dependent on them(80 % of all of the workforce hired in nuclear power plants), whose victimization has supported the nuclear plant business, a strong point (for making money) as well as a weak point(as far as safe operation is concerned). The recovery work does also rely on these workers, paid low per day, often hired by questionable sub-sub-sub ?sub contractors. The worker's status and working conditions are as unstable, dangerous and disastrous as the contaminated environments they are tackling with. What can you expect from these facts of the matter?

Yes, there were some people who invited me to the government committee and urged me to implement what I have in mind. And I have a few plans I would like to do. But, this does not matter much in the face of the going catastrophe, The fact of matter is beyond such a small choice as whether I join or not, Truly, nobody including me of course, knows what to do with the situation.

10.3 Oceanic Pollution All over the Pacific

— Tell me what you know about the sea pollution.



Computer Simulation of the Pacific Ocean Radiation Pollution Caused by the Fukushima Nuclear Power Plant Accident.
Source: NOAA(National Oceanic and Atmospheric Administration, USA)

Mr.Koide: It is an undeniable fact that the sea, particularly the ocean east of the Plant (the Pacific Ocean), has been increasingly polluted. A high level of radioactive contamination was detected from the sand and sediment at the bottom of coastal water area between the quay of the plant and the concrete breakwaters offshore. The fish and seaweeds living there are also contaminated. An absurd plan came out, the plan to put up nets at gateways between breakwaters in order to prevent the contaminated fish inside from going out to the open sea. The nets contain the fish all right, but they cannot stop the flow of contaminated water. In fact, sand lances(small fish belonging to Ammodytes) caught offshore in the Pacific Ocean were reported to be highly contaminated. At any rate, the coastal sea near the plant are clearly contaminated dangerously.

So the polluted water goes out into the open sea, the Pacific Ocean, where it is believed to be diluted. That is why TEPC intentionally dumped 3 million gallons of “low-level” contaminated water into the Pacific Ocean to make room in their storage ponds for another amount of contaminated water. But dilution is not solution nor is it elimination. There is growing contamination of both the Japanese coastline and the Pacific Ocean that extends to the American continents. TEPCO admitted over 400 tons of contaminated water flows into the Pacific Ocean every day. Driftage from Fukushima were reported to arrive at the west coast of North America, which means radiation also is reaching there.

The vastness of the Pacific Ocean does not eliminate radioactive materials which have long half-lives. Seaweeds take radiation in water, then smaller fish eat the contaminated seaweeds, and larger fish eat the polluted smaller fish, and then— the food chain continues like this until humans at the top eat contaminated food both in Japan and in America as well as elsewhere in the world.

Radiation on the ground does not spread and move so wide as in the air. Winds and rains carries and drift it here and there, but not so extensively as the ocean tides do. Ocean contamination is so diffusional and spreading that it is difficult to detect. Adding to that , as the government and TEPCO don’t seem motivated to monitor it, we suffer from the lack of data on the oceanic nuclear contamination.

What worries me most in this respect is water contamination with radioactive strontium. Cesium, highly-volatile, goes up and become diffuse in the air, causing air pollution. Strontium and plutonium discharged in the air were considerably less than cesium; one thousandth of cesium in the case of strontium and one ten-millionth of cesium in the case of plutonium in amount. The air is, therefore, polluted chiefly by cesium.

With sea pollution, what matters is water-solubility rather than volatility. Strontium is as much water-soluble as cesium and reacts on contact with water to produce strontium hydroxide and hydrogen gas. You must take strontium contamination into account. As you know, at the beginning of December 2011, Over 45 tons of water highly contaminated with strontium escaped the plant, much of which flowed into the ocean. This is only one example. Strontium is very difficult to detect. It takes many days to examine the sample water to see how much contaminated with strontium it is. TEPCO and the government pay less heed to strontium than to cesium, but they should measure every radioactive material including strontium.

Chapter 11

Progress in Science

The anti-nuclear power generation movement could stop the government - nuclear industry's conspiracy to re-open the nuclear reactors in other plants in autumn of 2013, but since the pro-nuclear power generation Abe Administration was inaugurated, the country is again being ready to shift back into high gear and bring its suspended reactors back online. (At the time of this translation Sendai nuclear plant in southern Japan became the first to begin operation in August 2015-note by translator) While at the same time, all the seismologists in Japan are warning that big earthquakes around the central parts of Japan and in its coastal areas are sure to occur simultaneously or trigger other quakes along the region at any moment. As it is estimated that possible damages would be greater than Fukushima, how dare the Abe government and the nuclear business go on restarting nuclear facilities! None want earthquakes but they will surely happen and humans cannot stop nor weaken them, said Mr. Koide, adding that the best policy in this earthquake-ridden country is "not building, not operating any nuclear power plant."

This interview was on the No. 1483 issue of the Jimmin Shinbun, June 2013

— The Nuclear Regulation Authority (NRA) which was newly established in September 2012 in reaction to the Fukushima nuclear accident declared that they would set the "strictest regulation standards in the world" for restarting of nuclear power plants, with its head saying they would undertake a radical review of the existing safety standards. What do you think?

Mr.Koide: NRA tried to draw up "safety standards" at first, but changed their mind to make up "regulation standards" , since they found it impossible to affirm safety of nuclear power generation beforehand. Preparing the perfect safety standards would be an act of God, because none can predict when machines or equipment go wrong. Troubles would happen to everything. You see, 57 small accidents have happened since the Chernobyl disaster in 1986 until 2008. So, instead of "safety standards" , they turn to "the strictest regulations in the world." But if they built "the strictest regulation standards in the world" in the true sense of the term, no nuclear power plant would be able to work in

the earthquake-ridden Japanese islands.

NRA was formed on the basis of the Atomic Energy Fundamental Act, whose objective is to secure energy by development and utilization of atomic energy. Therefore, whatever regulations NRA may draw up, “the development and utilization of atomic energy” , that is, promotion of nuclear power generation, is the prerequisite. Unless we abolish the Atomic Energy Fundamental Act and enact, say, “De-Nuclear Power Generation Act” , NRA would act as a political maneuver for re-operation of nuclear power plants.(In fact, NRA approved the operational safety programs for Sendai Power Station in May, 2015 – note by translator)

— The government present a plan to complete the decommissioning in 30 years. Is it possible?

Mr.Koide: Well, first of all, people would make a plan after they affirm the situation through objective analysis and understand what they can do in the situation. I wonder if the government knows what decommissioning is. It is quite different from dismantling other power plants where there are no radioactive materials that require special precautions.

First they will have to move the spent fuel rods stored in the pool of Unit 4 to a place requiring less protection from radiation for the general public. It would be an extremely difficult task, as I explained elsewhere (chapter 7).

A spent fuel rod, when it is taken out of water and in touch with the air, discharges at once so extremely strong radiation that people nearby would die almost instantaneously. So they put a transportation container made of iron and lead called the “cask” into the pool, relocate the fuel assembly into the cask, seal it, lift it up on to a truck, and transport it.

The cask weighs 100 tons. A giant crane is needed to lift it. The old crane at the top of the Unit 4 building has been blown off together with the operation room. TEPCO is dismantling the crippled upper part of the building in order to rebuild it and to install a new crane. It is said that the reconstruction work will be finished at the end of 2013.

After the completion of it, they will set about the difficult job of removing the 1331 spent nuclear fuel rods. A mishap such as a drop of a rod from the claw of the crane would cause a catastrophic radioactive pollution and a long delay of the work. I wish they would succeed, but I sometimes wonder if they could do it all right.

When they make it through, three more spent nuclear fuel pools in Units 1,2,3 remain ahead to be cleaned. The buildings of Unit 1 and Unit 3 are battered. The dilapidation of Unit 3 in particular is so severe that it may take years to clean the wreckage away. An accident or a mishap is inherent in any work. The other day, they were trying to remove rubbles with a remotely-operating machine when that machine dropped a rubble into the spent fuel pool. This kind of accident happens and delays the work.

In the case of Unit 4 which was in the state of shutdown to have the regular checkup at the time of the accident, there was no nuclear fuel in the nuclear core and therefore no meltdown occurred. That means Unit 4 provides the working environment less radioactive contaminated than Units 1,2,3. That is

why TEPCO is starting with Unit 4. But when it comes to Units 1,2,3, a high-level of pollution defies human approach. All the work must be done by using various pieces of remote-control apparatus. So it will inevitably take a long time. However long a time it may take, there are no other ways to do it than taking out the spent fuel rods one by one with utmost caution by remote-control. Ten years? Twenty years? I don't know.

The next problem awaiting them is how to take out the melted-down nuclear fuels. But none know where some fuel that had melted down through the containment vessels lie now and in what form it exist. It is simply missing.

You remember the 1979 melt-down accident at the US Three Mile Island Nuclear Power Plant. About half of the reactor core had melted down on the floor of the pressure vessel, but they could restore the vessel near to its normal state before the floor of the vessel dissolved. They could inject water in and fill the pressure container. When they opened the cover of the vessel five or six years later, they found water left in there. They linked the vessel directly to the spent fuel pool, from which they could take out the melted-down core, once like hot pulp, but firmed up owing to the water left in the vessel.

But in the case of Fukushima accident, the bottoms have fallen out of the pressure vessels. Melted cores, in the form of lavas, have passed through the basements of Units 1,2,3 and to be somewhere unknown to us. TEPCO announced "the fuel stays on the floors of the pressure container" . According to their explanation, Unit 3 melted down, to be sure, and the melted fuel penetrated the pressure vessel, fell onto the bottom of the containment vessel made of one meter thick concrete, melted about 68cm into the concrete, and stops there. Therefore, they announced that melted fuel did not penetrate the containment vessel and some fuel still remains at the core part." In other words, the containment vessel does the job of containing radiation all right, they insist.

But the fact that water they inject into the containment vessel goes out soon means the vessel is severely damaged. It is logically natural to assume that melted fuel also goes out of the one meter thick floor down to somewhere. If so, any high-tech machine could not pick the nuclear fuel up, since its location is unclear and its condition, melted or solid, is also unclear.

The government's plan is to take out all the nuclear fuels from the plant in 30 years and begin the work of sealing off the plant. But the mere fact that the melted fuel cannot be taken out shows that the government's roadmap has no practical meaning.

11.1 One of the Best Policies of Earthquake Countermeasures is "No Building, Not Operating any Nuclear Plant"

— Preparation for re-operation of the now dormant nuclear power plants are going on both politically and physically. They may restart one actually this autumn, though people's movement against it grows in strength. And the threat

of the big earthquakes weighs heavily on us, and the local governments are busy preparing for them. Let me hear your view on this strange situation of re-opening of nuclear power generation under the threat of big earthquakes.

Mr.Koide: I am not a seismologist and cannot tell what earthquakes will occur. The energy the Great East Japan Earthquake of magnitude 9 , which triggered Fukushima nuclear accident, released is equivalent to that of 30 thousand Hiroshima-type atomic bombs. Humans can do nothing when such a big quake happens.

Even I, non-professional , see that the Japanese islands have entered the unquiet ages when the movement of the earth- crust has become active. The Great East Japan Earthquake is a phenomenon caused by the unrestful movement of the crust, and many more, as seismologists predict, such as Tokai, Tonankai, Nankai earthquakes may attack us at any moment.

Nobody want earthquakes. But since Japan is an earthquake-ridden country and human beings have no ability to control nor to deal with earthquakes, one of the best policies of earthquake countermeasures is “ building no nuclear power plant and not opening any nuclear power plant.”

— You are a scientist. Do you believe in the progress in science? Do you believe the scientific progress is also the human progress?

Mr.Koide: (laughing) Science makes progress steadily step by step. But one step ahead, then more areas unknown appear. I think science was born from the human curiosity to know the unknown. The more you know, the more areas unknown to you increase. Science is an endless activity.

If your question means, “does the progress in science contribute to human happiness” , my answer is, “not always” . Weapons to kill and destroy are products of science. In case a soldier kills an enemy to whom he has no personal grudge with non- scientific arms such as a knife or a stick, he may have a chance to repent his crude act, because he can see with his own eyes what he has done. But science produced bombing planes. A pilot soldier killing people don't see what agonies, what hell, he has created. When it comes to guided missiles, it is no more “killing” but a kind of “computer game” to soldiers. The “progress “in science bring about the “degrade” in humanity. I don't want to call it the progress of science.

As to the question of human progress, my answer is simply “no” . On the contrary I think the human race has continued their degeneration.

What is unknown today may become known to us tomorrow, but another unknown grows at the same time, and there is no guarantee that the known will contribute to human happiness. As the recent science shows, it is more likely to contribute human unhappiness.

Chapter 12

Brief History

2011

March 11 14:46 The Great East Japan Earthquake

Unit 1,2,3 reactors shut down automatically after the quake.

Unit 4 6 were out of operation for the periodic checkups.

15:27 the first wave of tsunami Station blackout

15:45 the oil tanks for emergency diesel generators swept away by the tsunami

16:36 pouring water into the cooling system of Unit 1 found impossible

20:50 evacuation directive to the 1864 inhabitants within a distance of 2 km from Unit 1

21:23 the evacuation directive expanded from 25 kilometer to 3 kilometer radius. Instruction for residents within 3 10 km from the plant to stay indoors.

March 12 0 :49 extraordinary pressure rise found in the Unit 1 containment vessel

14:12 TEPCO announcement that it is possible a partial meltdown is under way in Unit 1 .

15:36 hydrogen explosion near the Unit 1 reactor

18:25 the evacuation directive expanded again to 20 km from the plant.

20:20 start of inject of seawater with fire-fighting equipments into the Unit 1

March 13 2 ;44 the high-pressure injector system of emergency core cooling system of Unit 3 stopped working

4 :15 the nuclear fuel rods of Unit 3 began to be exposed.

13:12 start of injecting seawater into the Unit 3 nuclear reactor. March 14 1 : 10 TEPCO stopped injecting seawater into Unit 1 and Unit 3 owing to Prime Minister' Kan's concern that it might lead to recriticality.

11: 01 hydrogen explosion at the Unit 3 building.

13: 25 the emergency core cooling system stopped working in the Unit 2

13: 34 start of injecting seawater in to the Unit 2 reactor

19: 45 all the nuclear fuel rods in the Unit 2 reactor fully exposed, injection of seawater to refill the reactor with partial success

23: 39 extraordinary pressure rise in the Unit 2 containment vessel.

March 15 0:00 TEPCO opened a valve of the vessel for a few minutes to lower the contained pressure in order to replenish water. TEPCO thinks no radiation leakage occurred during the venting.

01: 11 the reactor pressure of Unit 2, from 1.44MP a to 0.92MP a.

02: 30 restart of seawater injection to the Unit 3 reactor

03: 00 containment pressure of Unit 2 exceed the set pressure.

06: 10 abnormal noise occurring around Unit 2 suppression pool. Reduction of pressure within the pressure suppression system.

06; 14 smoke rise from Unit 3

06: 14 blast sounds from Unit 4, and the breach in the building wall detected. 07(around) about 650 staffs(90% of the whole) evacuate the site to find shelter in Fukushima Daini Plant on the order of Director Yoshida

08:25 white smoke rising detected at the fifth floor of the Unit 2 building

09: 38 fire erupting detected around the north-west part of the 3rd floor of the Unit 4 building

10: 22 400mSv/h of radiation measured around the Unit 3 building

11: 06 the residents living between 20km and 30km from the plant urged to stay indoors

March 17 09: 48 Self-Defense Force helicopters drop seawater on the Unit 3 spent fuel pool, and on the ground the riot police spray water onto the Unit 3 building with a water cannon

March 20 14: 30 Unit 5 cold shutdown condition

19: 27 Unit 6 cold shutdown condition

March 24 10: 00 Two workers laying cables in the turbine hall of Unit 3 standing in ankle-deep stagnant water found to have received a dose of 170 180 mSv during their 40 50 minutes' work.

March 25 08: 30 50Bq/cc of radioactive iodine 131, 1,250.8 times more the limit level permitted by the nuclear reactor regulation, detected in the seawater collected from offshore spot 330m from the southern drain outlet of the plant

The Food Safety Commission of the Cabinet Office decide it will make the food regulation limit on radiation more lax, and the Health, Labor and Welfare Ministry decide it will reset more lax standard limits on radioactive materials in foods.

March 27 The Ministry of Economy, Trade and Industry disclose 2.9GBq/cc of radioactive iodine 134, ten million times higher in density than the radioactive water in a reactor in the normal state, detected from a puddle of water in Unit 2. Amount of radiation measured on the surface of the puddle exceed the calculable extent of the dosimeter (more than 1 Sv/h)

March 28 TEPCO disclose plutonium 238, 239, 249 were detected from the soil collected within the plant premise on May 21 and 22.

March 31 TEPCO disclose detection of 430Bq/cc of radioactive iodine 131, ten thousand times over nuclear safety standards, from the groundwater

April 2 contaminated water of great density found spilling to the sea from the cooling water intake of Unit 2

April 4 TEPCO discharge low-level radioactive polluted water to the sea to make room for storage of high-level radioactive contaminated water

April 12 The Nuclear and Industrial Safety Agency decide to raise the rating of the Fukushima accident to Level 7 on the International Nuclear and Radiological Event Scale, the highest and the same as the 1986 Chernobyl accident

April 22 the government declare a 20 km zone around the plant as a “caution zone” . An area essentially forbidden to enter

May 12 TEPCO disclose the extraordinary low-water stage of Unit 1 reactor, and admit meltdown

June 17 TEPCO say high-level radioactive polluted water treatment system in full-scale operation

October 28 covering the Unit 1 building completed

November 2 radioactive xenon detected in the Unit 2 containment vessel, but TEPCO deny recriticality occurring there

December 16 the government and TEPCO jointly announce “cold shutdown” of the three reactors that suffered meltdowns.(” cold shutdown” meaning nothing in any practical sense) and prime minister Noda declare “the most critical phase is over.” (he used a strange Japanese “jiko shusoku” which literally translate into “ accident convergence” , meaning, perhaps, “no more spreading of effects of the accident.”)

2012

January 31 a mayor of Kawauchi village located within 20km from the plant, later realigned as part preparing for evacuation advisory to be lifted, and as part still remaining as “no go” zone, declare the will to go back to the village, the first village to show the wish to go back among Fukushima nuclear disaster affected villages.

February 28 a private investigating team report then-prime minister Kan’s intervention in the scene of the accident confused the recovery work at the early stage.

May 12 the implant of nitrogen into the pressure vessels of Unit 1,2,3 suspended. The suspension last until April.

April 5 estimated 12 tons of radioactive contaminated water found to have leaked due to leakage from the deteriorated pipes.

June 20 TEPCO’s in-house investigation team’s report say the cause for the accident was the underestimate of tsunami emergency

June 28 de facto nationalization of the Fukushima Nuclear Power Station and restart of recovery work under the new administration

July 5 the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission(NAIIC) release a summary report blaming Japanese culture for the fundamental causes of the disaster, namely the parliament officially declaring the crisis a man-made disaster.

July 18 taking out unspent fuel rods from the Unit 4 pool experimented

July21 an act of dishonest to fake dosimeter readings discovered. TEPCO subcontractor order the workers to cover their dosimeters with lead plates in order to keep radiation doses low enough to continue working under dangerous conditions.

July 23 final report by Investigation committee on the Accident at the Fukushima Nuclear Power Station of TEPCO admit the culture of dependency

on the “myth of safety” caused the disaster and urge a new culture where risks are acknowledged as risks and straightforward discussion is held about risks to be created

August 6 a visual document of TEPCO’s TV meeting opened to the public for the first time

August 10 the lid of Unit 4 containment vessel removed

August 30 the amount of water injected in the reactors of Unit 1,2,3 decrease. This water-decrease trouble continue until mid-September.

September 19 the Nuclear Regulation Authority come to being

September 22 During the clean-up operation of Unit 3 fuel pool, a steel beam debris dropped from the crane.

2013

February 7 it is revealed that TEPCO gave NAIIC false explanations concerning the condition of the Unit 1 reactor building.