

B

eyond the Nuclear Disaster of FUKUSHIMA

A Consideration on Nuclear Use and Social Transformation in Japan: Critical Analysis through the Development of “Plutonium Road”ⁱ

Takaharu Okudaⁱⁱ

Since the dawn of nuclear material plutonium, the artificial 94th element named after Pluto, king of Hell 70 years ago, we are forced to be integrated in developing “nuclear society” which means increasing dependence on nuclear energy for maintaining our livelihoods.

The present way of nuclear utilization inevitably causes strengthened center-periphery discriminations and enforcement of sociopolitical contradictions to the weak civilians in rural communities. As R. Jungk criticized, deepening dependence on nuclear power will lead our society to be more authoritarian one, and basic human rights will be more fragile under the name of securing safety management of it. We can see nuclear power has spread globally not only by military use but also by “peaceful” way such as worldwide business for selling nuclear power plants to the emerging markets. This trend might endanger global citizens’ society to break up by increasing oppression from the authorities. Through tracing on the developing “plutonium-road” in which human being has been forced to be integrated, we can consider how we should make actions for being liberated from fatal menace of Pluto, king of Hell.

ⁱ This article was simplified and translated from the original article of Takaharu Okuda published in Japanese on *Shonan Forum*, the Journal of Shonan Research Institute, vol.15, March 2011 just before happening of the East Japan Big Earthquake and the nuclear disaster at the First Fukushima nuclear power plants. This article brought an unexpected critic on “inconvenient prediction” to the contemporary Japanese sociopolitical situation after *the Fukushima* as well as a sound of alarm bell for the tendency of deepening dependence on nuclear energy in Japan.

ⁱⁱ Professor, Faculty of International Studies, Bunkyo University

1. Introduction: Birth of the “Fire of Pluto”

Please pay your attentions to an artificial material named plutonium. It is dangerous enough to cause fatal destruction to human being, and increasing amount of it will possibly cause drastic change of the global society in future.

In the international community, the contrived myth that is strongly connected with that material becomes popular and powerful. Under the arguments for preventing global warming from cutting the volume of CO₂ exhaust, a “tacit consensus” is being formed in the world, especially in the developed countries as well as in some Asian emerging markets that have been catching up them rapidly. It is becoming global understanding that we need to develop nuclear energy use for the purpose of securing our increasing energy demand and reducing exhaust of greenhouse effect gasses simultaneously. In short, development of nuclear power plant is vital issue not only for global environmental protection but also for advance of human society, so many authorities have showed off. Growing pressure for entrusting the future of human being to atomic power is doubtlessly accepted by the Japanese authority. The Japan Nuclear Committee (JNC) that is executive organ for making atomic power use development policies, for example, has expressed its intention for developing nuclear power plants as below,

“...In Japan, about 28% of 1 trillion kwh of electricity generations of the year 2009 were derived from nuclear power plants. Nuclear power has some advantages for elec-

tricity generations by the reasons that nuclear power plants can operate stably and global supply-chain of uranium is also sustainable. Its development, therefore, has important significance for securing energy supply more reliable. In addition, atomic power is effective for reducing greenhouse effect gasses. From the point of achieving of environmental protection and sustainable economic growth, it has become an international consensus that we need to develop nuclear power use.” (Annual Paper of JNC, 2010)

The artificial nuclear material plutonium was born inevitably in the use of atomic energy. It, however, can cause astonishingly large amount of people to death even if it is very small volume. In addition, as it can generate enormous energy enough to perish all creatures of the earth, human society must make great efforts to manage risk control of it by paying vast social costs and establishing center-powered, totalitarian political system for securing more effective watching management and strong control of the people. So, we cannot help questioning about the next theme. How can human being survive and co-exist with the menace of plutonium?

Plutonium was originally developed for the purpose of military application i.e. atomic bombs dropped on Hiroshima and Nagasaki. In the end of 1940, the academic research team of University of California directed by Glenn T. Seaborg, American scientist and chairman of the US Atomic Energy Commission after the World War Two, gave birth to some micrograms of an unidentified material. It was named plutonium after Pluto, king of Hell in the next year.ⁱⁱⁱ And the Jones Chemical Institute

ⁱⁱⁱ In the periodic table of the elements, plutonium is the 94th element. Naming of newly discovered element was synchronized with that of planet in the beginning of the 20th century. For example, uranium of the 92th element was named after the planet of Uranus and neptunium of the 93rd one was done after the planet of Neptune. For the reason the 94th artificial element was the next to neptunium, plutonium was ironically derived from the name of planet Pluto, king of Hell.

of University of Chicago succeeded in extracting measurable amount of it on August 1942. The existence of this nuclear fissionable material, however, was in secrecy strictly till 1946. Of course, this was due to the fact that plutonium had big potentiality as weapon, i.e., for military use.

Fissionable plutonium²³⁹ (²³⁹Pu) is born by transforming non-fissionable uranium²³⁸ (²³⁸U) for absorbing a neutron in operation of nuclear power plants. And ²³⁹ Pu is extremely toxic material enough to make death of more than 500,000 peoples only by 1 gram and a half-life of period of it is about 24,000 years which means it has semi-permanent life of harm for all creatures. And its critical mass for making nuclear fission is about 5kg. Even though “purity” of ²³⁹Pu produced in operation process of ordinal nuclear power plant must be relatively low degree, it is about 6.6 kg enough to make fission. For 70 years, the fire of Pluto has increased rapidly in international community, and we have now possessed more than several thousand tones of plutonium. It means the most dangerous material as ever becomes outrageous menace to all creatures not only to human being. Moreover, increasing plutonium may show us another prospect of social transformation. I mean deepening dependence on nuclear energy will lead the regime of any nation to be more authoritarian one in the pretext of safety management of it as Robert Jungk, prominent science journalist, warned the tendency of emerging “Atomic Empire” more than 30 years ago.^{iv} Not only from the viewpoint of spread of nuclear weapons, but also from that of increase of nuclear power plant, we need to counter to the threat of globalization of atomic power in the contemporary world.

In this paper, I consider how can we global citizens criticize it and find out the way to overcome the increasing menace of plutonium through tracing the “plutonium-road” by connecting time and space of some spots symbolizing the emerging trend for “Atomic Empire.”

2. Mushroom Cloud Breaking out in the Trinity Spot

The Manhattan Project started on September 17, 1941 when Leslie R. Groves, Lieutenant General of the US Army, was appointed director of it by the president F. D. Roosevelt. Its final decision was done by the Defense Commission on December 6, 1941, the date of which was just the previous day of Pearl Harbor attack.

The project for succeeding in atomic explosion was accomplished by spending 2 billion dollars and mobilizing 600 thousands peoples in total directed by the growing US military-industrial complex. From the origin on nuclear development, the project was totally under the control of authoritarian bureaucracy, and that gigantic modern technologies were kept accompanied with increasing secrecy as well as strengthening oppress against civilians’ rights. The essential technologies of the secret project were enrichment of fissionable ²³⁵U, operation of nuclear power plant for transforming ²³⁸U to ²³⁹Pu and reprocessing of nuclear materials for extracting pure ²³⁸Pu from other nuclear wastes. These are totally succeeded to the present nuclear use for power generation. We can realize there is little difference on the development of civilian use of nuclear power with that of military one.

Three years after, 3 atomic bombs were com-

^{iv} Jungk, 1977

pleted by July of 1945. One was the A-bomb of uranium with gun-barrel ignition type and the rest two were ones of plutonium with implosion ignition type. Especially, as the latter were needed to ensure the real explosion for solving uncertainty on triggering devices, one of the two was experimented with success in the desert of Alamogordo of New Mexico on July 16, 1945. The code name of the experimental spot was called Trinity named after holy identity of Christianity. It was, however, far from sacredness. Rather, it symbolized the “another trinity,” i. e., complex of American ambition for hegemony in global power politics after the war, astronomical budget and powerful authoritarian system for controlling so many scientists and engineers. When Robert Oppenheimer, physicist and director of the Los Alamos National Laboratory as leading organ for developing A-bombs, saw the mushroom cloud from the Trinity spot, he remarked later reminded to his mind words from Bhagavad Gita of Hindu epic poetry, “Now, I become Death, the destroyer of whole world.” And Groves also looked back his experience in the Trinity spot and reported afterward that the explosion had accompanied with unexpected bomb blast and gigantic fire-ball growing lasted several minutes.”^v

The rest two A-bombs were the Little-Boy of ^{235}U dropped on Hiroshima and the Fat-Man of ^{239}Pu did on Nagasaki. Dropping A-bombs on mainland of Japan was already decided by Roosevelt and Churchill in the second summit at Quebec in Canada and the memorandum of the two concluded at Hyde Park meeting in New York in 1944. And

after H. S. Truman inaugurated the 35th US president, he was informed the existence of these final weapons and made decision to use them soon after the surrender of Nazi German. Till then, the American Air Force performed strategic bombing over almost all Japanese cities by dropping enormous incendiaries on. Indiscriminate massacre like that way was originally developed by the Japanese forces during the period of invasion to China, such as large-scale bombing on Nanjing, Chongqing and other main Chinese cities targeting for all people including innocent civilians. A-bombs were nothing but ultimate embodiment of this ideology of mass-destruction in succession of Japan’s strategic bombing.

On August 6, 1945, the Little-Boy was dropped on Hiroshima and it caused more than 140,000 people at a moment to death with heat, blast and radiation rays.^{vi} Hiroshima was one of the biggest centers of military production in west Japan and escaped the full-scale bombing till then, which meant the US authority could measure the power of new bomb easily. Even though the US could give psychological damage to the authority of Imperial Japan for surrender, the decision of dropping A-bomb on Hiroshima was quite inhumane behavior that forced 350,000 habitants of the city including more than 30,000 Koreans, Chinese, nations of Southeast Asian and even American citizens as well as Japanese to death indiscriminately.

3. Political Time and Space between Alamogordo and Potsdam

In contrast with the aggressive advance of

^v Aczel, 2009

^{vi} By the end of the year 1945, numbers of the death by the Little-Boy accounted for more than 200,000 people in Hiroshima.

Soviet Union's military troops from east after the victory of the battle of Stalingrad in 1942-43, the preparation for counterattacking to the Nazi German by Great Britain and the US was far behind it even in the beginning of 1944. In the United Nations, conflict between Soviet Union and the two western powers was being emerged on the issue of each sphere of influence over Central Europe or Middle East. While Great Britain and the US desired to maintain their hegemony in the post-war international order by reorganizing colonial regimes of the Third World by their initiatives and securing natural resources, Soviet Union aimed at increasing their ideological influence of its authoritarian socialism over global stage. As the result, the growing conflict in the United Nations was emerged as ideological hatred in each other in disguise.

As Soviet Union, then, could finally get its victory to the Nazi German, Joseph Stalin dared not to fight directly against Imperial Japan by the consent of the Neutrality Pact of 1941. However, he wanted to increase Soviet's influence over East Asia urgently because of growing hostility against Great Britain and the US on the issues of occupation policy of German (especially on that of administrative sphere of division of Berlin), legitimacy of the governments in Eastern Europe, sphere-rivalry of the Balkan Peninsula etc. On the other, the US government was anxious about estimated enormous casualties of American soldiers if it had started operation of landing on mainland of Japan. From the US strategy, it needed to urge the entry of Soviet forces into the war against Japan for the purpose of reducing its military burden. On February, 1945, the summit of the three powers was held at Yalta, resort city at the Crimean Peninsula. In the Yalta

Conference, the secret agenda on the entry of Soviet Union to the war against Japan after a few months of the Nazi's surrender was agreed, in return for recognition of its annexation of southern part of Sakhalin and Kuril Islands as well as securing its interests in Manchuria after the war.

The success of A-bomb's experiment in Alamogordo, however, brought the drastic change to the situation of international balance of powers. Because of it, the US could convince the victory of the war against Japan and exclude the necessity of Soviet's entry. Rather, it could have strategic opportunity for forcing pressure to Soviet Union for securing its hegemony in the post-war international order. At that time, the summit of the three powers was held at Potsdam of German. In the conference, Churchill and Truman came to consensus that Soviet's entry had no merit and was even harmful for their interests. Churchill remarked a scene of Potsdam in his famous memoirs as below,

“...in the afternoon of the day, the US Secretary of State Henry Stimson came to me and put a paper on the desk. It was written that the baby was born contentedly. ... We did not need Russian Army any more. The final stage of the war against Japan did not depend on the entry of Russian forces for doing the last and perhaps long battles of massacre. We did not need to ask Russians for their help. A few days after, I sent a memorandum to Foreign Minister Sir Robert A. Eden, “Now, it is clear the US does not desire to make Russians enter into the war against Japan.” [Churchill, 1952]

After the Potsdam Conference, Stalin hastened his troops to deploy in Far East and carried out the agreement of the Yalta Conference. On August 8, 1945, Soviet Union broke out the Neutrality Pact

and declared the war with Japan. More than 1,500,000 Soviet troops made attacks and invaded into Manchuria, the Korean Peninsula and southern Sakhalin. In that situation, the US dropped plutonium bomb on Nagasaki. The use of this final weapon had different political meaning with that on Hiroshima, i.e., the US authority could show off the destructive power of A-bombs to the advancing Soviet's troops to south and contain towards them.

4. Air Route of B-29 Bockscar: From Tinian to Nagasaki

When the experiment of A-bomb was achieved with success in the Trinity spot, some scientists of the Los Alamos National Laboratory had already arrived at Tinian Island of the north Marianas where the US troops had occupied after furious battle against Japanese army during June-July, 1944. The island, locating at 2,400 km from mainland of Japan, was the keystone from which the US Air Force could fly B-29, the newest bomber called super-fortress, to mainland of Japan for bombing directly. Many parts of two A-bombs were conveyed to this small island secretly. According to a fixed plan, the tasks for dropping them on Hiroshima and Nagasaki would be completed by the end of July.

At that time, there were 4 trucks of runway in the island. Originally, they were constructed by Japanese army with many Korean forced laborers. And the US forces promptly enlarged them after occupation so that they could fly B-29. The bomber loading with the Fat-Man was Bockscar commanded by Major C. W. Sweeney of the 509th Composite Group. In the body of it, there was message written by Rear Admiral US Navy W. R. Purnell, supreme naval director stationed in Tinian, "A second kiss

for Hirohito." Giving up dropping the Fat-Man on very cloudy Kokura city as the priority target, Bockscar changed it to Nagasaki. On time of 11:02, August 9, 1945, the Fat-Man exploded over 240,000 Nagasaki citizens brought a crushing blow with more than 73,000 casualties and about 19,000 houses' destruction at a moment.

Think again, can *the Nagasaki* be really needed? D.A. Aczel, the US science journalist and author of the book *Uranium Wars* (2009) said, "Imperial Japan could have just a few days of thinking from dropping of the Little-Boy on Hiroshima to explosion of the Fat-Man on Nagasaki. Many Japanese could not understand nor grasp the destructive damage in Hiroshima. But they were not allowed to have time enough to judge it objectively." Rather, the tragedy of Nagasaki had much relation with the establishment of the post-war international order. It worked as vital tool of the political show to threaten Soviet Union increasing its influence in Far East. We can say that people exposed to radiation in Nagasaki (more than 140,000 were died of it) were the first victims of the Cold War. On the other, the supreme directors of Imperial Japan including emperor Hirohito had great responsibility, for they wasted long time to persist in maintaining its imperial regime, putting off decision-making for ending the war and finally allowed the US Air Force to drop A-bombs on Hiroshima and Nagasaki.

Atomic explosion in Nagasaki demonstrated the fact that several kg of plutonium surely led to be the final weapon depriving numerous people of their lives indiscriminately. After *the Nagasaki*, nuclear weapons were improved to be smaller and lighter to load on inter-continental ballistic missile. *The Nagasaki* was also the turning point that made

Soviet Union step into nuclear armament for countering to the menace from the western world. Thus, all people in the world were threatened under increasing anxiety of nuclear terrors after *the Nagasaki*.

Today, the old North Field in Tinian of the US Air Force is covered with many bushes and rarely used except several military drills in a year. We can see the historical two loading-pits of A-bombs covered by tempered glass in it. In the day of August 9, 1945, the Fat-Man of plutonium bomb was loaded on Bockscar and dropped on Nagasaki after 6 hours flight. One of the photos on the loading-pit shows the bomb was covered with black sheet. This means it had special secrecy comparing with the Little-Boy. We can see a striking difference between the quiet landscape of Tinian and the anniversary prayers' day for peace in Nagasaki with many citizens on August 9. But we can also lesson from the two places that utilization of plutonium should bring a big hardship as ever to the future of human being and we should realize our destiny that the "co-existence" with it must be quite hard task. Combining the start point of Tinian and the end one of Nagasaki, human society came to step in the "plutonium-road" drastically in the latter half of the 20th century.

5. Fast Breeder Reactor Monju: Good Dream or Nightmare?

Japan, the country experienced in nuclear catastrophes twice, has also ridden on the "plutonium-road" in post-war period by developing so-called peaceful use of atomic power. At present, 54

nuclear reactors including one pre-commercial Fast Breeder Reactor or FBR are operating in Japan. ^{vii}

Along seaside of the Tsuruga peninsula at Fukui prefecture, central- north region of Japan, only one paved road can lead us to the site of the FBR Monju named after intellectual Bodhisattva. We have no choice but pass through one tunnel for exclusive use with strict guard and watching for all day long to see it. No photo is permitted, of course. The Monju is quite different type of nuclear reactor with the other Light-water Reactors (LWRs) operating in Japan. Instead of light water in LWR, metal sodium is used as material for controlling acceleration of neutron to control nuclear fission in the reactor core. In nuclear reaction of FBR's core, it is expected that non-fissionable ²³⁸U can be transformed into fissionable ²³⁹Pu efficiently and more plutonium can be produced than LWR. According to a physical logic, output of plutonium can be expected much more than that of input in operation of FBR. That is the reason why FBR is called "dream nuclear reactor." The development of FBR in Japan started in 1967 when the Power Reactor and Nuclear Fuel Development Corporation (PNC) was founded. In 1977, the Joyo, small-sized FBR for experimentation became critical stage and the Monju as proto-typed one with output capacity of operation of 280,000 kw did in 1994.

Well, the life of fuel stick consumed by nuclear power plant is about 3-4 years. According to the present scheme of the nuclear fuel cycle project which is advocated by the Japanese government and electric power companies, these wasted nuclear

^{vii} After the big earthquake in East Japan and disaster of the 1st nuclear power plants of Fukushima on March 2011, most of Japan's nuclear power plants are forced to stop their operations. The government and the oligopolistic electricity businesses, however, have tried to make their work resume in spite of many citizens' opposition. (*Additional note)

fuel sticks are to be disposed by extracting plutonium and other nuclear materials for reuse or wastes in the nuclear reprocessing facilities in the projected Rokkasho village of Aomori prefecture as well as those in abroad (England and France) after about 30-50 years for their cooling. So, plutonium has inevitably accumulated in keeping with operations of nuclear power plants. The main purpose of FBR's operation is to reuse it more "effectively". Thus, FBR occupies vital part for developing the nuclear fuel cycle. Because Japan is a country of small natural resources, this logic seemed to be very persuasive till recent years. However, it has explained little on danger of radioactive wastes, nor, way of disposal of them which must be doubtlessly caused from that cycle. In this analysis, it becomes clear that FBR has much relation with this "inconvenient facts." Contradictory, the projected nuclear reprocessing facilities in Rokkasho village would not be needed any more if the FBR development project were not performed very well. It means recent noises from the Japan's authority on necessity of the nuclear processing facilities are nothing but deception. It says that it is needed to build up for producing MOX fuels or mixed oxide fuels, i.e., nuclear fuel of plutonium blended with uranium for utilizing them in LWR's operation. Again, why do the Japanese government and electric power companies forcibly incline into MOX production nevertheless the fact that the FBR development scheme is in stagnation and regarded as nearly impossible? I can point out the political or bureaucratic practice of Japan's authority that it cannot stop any project for keeping their appearances and freeing from their responsibilities once

it was decided to do. And as the other reason, any public enterprise calls vast amount of investment into the project, so construction of nuclear power plant is nothing but big business opportunity. Thus, due to the logics of bureaucracy and businesses, the present policies on nuclear energy use are quite ridiculous and they have alienated interests of the citizens from this issue in Japan.

The most critical situation on FBR should happen when some accident in the reactor core might lead leakage of liquid sodium to outside and its cooling function might be broken down. The technological system of FBR for controlling nuclear fission is far more complicated and difficult than that of LWR. And liquid sodium used as speed-reducing material of neutron can easily make spontaneous combustion in touch with moisture at normal temperature. If large amount of sodium leak happened and cooling function was lost, FBR would run out of control and cause more outrageous nuclear disaster than the case of *Chernobyl* disaster in Ukraine in 1989. Fortunately, the Monju has been escaped from the worst script till now. On December 8, 1995, it happened to have accident of sodium leak and fire though volume of leaked sodium was only 700kg of the total 150 tonnage when it reached the stage of 40% operation. After that, the Monju has been forced to stop its operation for 14 years.^{viii} This fire accident showed us the fragility and difficulty on managing the "dream reactor" and alarmed the scattering of plutonium is not groundless fear.

According to the draft of long-termed atomic energy plan made by the Japanese government issued in 1994, the first commercial-based FBR fol-

^{viii} After 14 years absence, the Monju restarted test operation in 2010. But soon after, it stopped operation again due to the accident of part falling in the reactor core. .

lowing the Monju would operate in the 2030's. However, due to the accident of the Monju and other many troubles including the facilities of nuclear reprocessing in Rokkasho village, the scheme of FBR development was obliged to delay and the time-schedule of the first commercial-based FBR was postponed to the 2050's in the governmental paper on the fundamental principles on nuclear use policies in 2005. In the stagnation on FBR development, we have no prospect to continue the project of it nevertheless the fact that the Monju wasted about one trillion yen till now and spent more than 50 million yen per day for its maintenance. In international community experienced *the Chernobyl*, because of the increased anxiety for global radioactive pollution and threat of spread of plutonium for military use, major countries became negative and renounced their FBR development schemes. In the US, for example, retreat from FBR development was decided in 1984 and closed due to the bad cost performance and anxiety for global spread of plutonium. In France also, the Phoenix, a proto-type based FBR, was forced to stop its operation for a long time owing to extraordinary output on unknown origin. And the Super-Phoenix, succession of the Phoenix of pre-commercial based FBR, was in trouble with accident of sodium leakage and was closed in 1988 after spending about 800,000 million yen, too. The situation was similar with the case of Great Britain or Germany. In contrast with their retreats from FBR scheme, the attitude of the Japanese authority persisting in developing FBR is extremely conspicuous and different.

In spite of setback of FBR scheme, plutonium has been produced and accumulated in the nuclear power plants in Japan. Increasing pressure for con-

sumption of plutonium urged the Japanese authority to take action for using MOX fuel in the LWR reactor. So many reactors such as Genkai (Oita prefecture), Ikata (Ehime prefecture), Takahama (Fukui prefecture), Fukushima (Fukushima prefecture), Onagawa (Miyagi prefecture) etc. have been taking part in MOX use. The operation of MOX use, however, is more difficult than that of ordinary nuclear fuel. It meant the system for stopping nuclear fission in the reactor core must be more complicated when something bad would happen. Moreover, the tremendous issue of increasing nuclear wastes cannot be solved any more. The development of Japan's "plutonium-road" in the pretext of peaceful use is becoming more complicated and contradictory in the maze of FBR or MOX use.

6. Landscape of Nuclear Society Looking from Rokkasho Village,

The Biggest Nuclear Base in Japan

We can say that nuclear power plant is very troublesome facility. In addition to the issues on its efficiency of power generation and anxiety about safety management, the most worried is the fact that we cannot dispose "nuclear garbage" exhausted from reactors without risk by any modern technology. We have accumulated nuclear wastes scattering radiation for long time through operation of nuclear power plants. In proportion to the level of their radiation, these nuclear wastes were divided into some groups from high-level to low-level ones and they are sealed up in canisters or drums which are piled up more than 1,000 per year in each reactor. In Japan, there operate 54 nuclear reactors but they have a little room of storage for increasing these wastes. So, what has become of them and where they have to go?

Table1. Outline of the Nuclear Facilities in Rokkasho Village

Facility:	Nuclear Reprocessing Factory	Temporary Storage Center of High-level Nuclear Wastes※	Uranium Enrichment Factory	Permanent Underground Storage of Low-level Nuclear Wastes※※	MOX Fuel Processing Factory
Outline on Capacity:	Maximum reprocessing capacity:800t/Y, Storage capacity of used nuclear fuel sticks: 3,000t	1,440 canisters in form of solid state by mixing glass for containment (2,880 canisters in future)	150t/Y in the first year and 1,500t/Y in completion	1 million of drums of 200l, and 3 million of drums in completion	Maximum capacity:130t HM (*4) /Y
Operation Year (including expecting year):	2010(*1)	1995	1992	1992	2016
Cost for Construction:	¥2.2 trillion	¥80 billion (*2)	¥250 billion	¥160 billion (*3)	¥190 billion

Source: Japan Nuclear Fuel Limited (JNFL), 2010

Note: *1: Because of frequent accidents on the process of solid state by mixing glass with high-level nuclear wastes, the time schedule for its full operation is postponed to 2012. As the result, the cost for its maintenance is to increase further from now on.

*2.For the cost of 1,440 canisters *3.For the cost of 1 million drums *4. Ton Heavy Metal, unit of metal mass of plutonium and uranium in MOX

Remarks: ※In the Temporary Storage Center of High-level Nuclear Wastes of Rokkasho village, there stored 1,338 canisters returned from the nuclear reprocessing facilities in England and France up to 2010. According to the official view of JNFL, Rokkasho's facility is temporary one for storage. But, the term of their storage may be semi-eternal as far as the "final disposal site" cannot be fixed. ※※ The numbers of drums buried in underground is about 220,000 up to 2010.

In the Shimokita peninsula, locating at northern part of the main island of Japan, most of all used nuclear fuel-sticks are collected and schemed to "dispose" in one spot. The nuclear facilities of Rokkasho village, Aomori prefecture, established by Japan Nuclear Fuel Limited (JNFL) as company performing national policy for the development of nuclear power plants are the biggest "nuclear base" in Japan including temporary storage center of high-level nuclear wastes, permanent underground storage of low-level nuclear wastes, uranium enrichment factory and nuclear reprocessing factory which is expected to start commercial-based operation in 2012. (See Table 1) Now in Rokkasho village, we can see 3 chimneys of more than 150m high from

the nuclear reprocessing factory. In case of full operation, they will exhaust small dust containing gaseous radioactive tritium, krypton etc. that must be spread and pollute air including remote places such as Akita, Iwate prefecture as well as Aomori through the strong northeast wind called Yamase, characteristic seasonal blow along the Pacific coast of northeast Japan. And from the outlet off 3km the coast of the facility, numerous thermal water containing radioactive materials will be exhausted into the Pacific Ocean and they must be carried off to Iwate, Fukushima, Ibaraki and even to Chiba prefecture ridden on the current to south. Perils of pollution and expose to radiation coming from the facility may be so big beyond our imaginations.

Same as the other peripheries in modern Japanese society, Rokkasho village has also been made fun of by the intentions of *the Tokyo*, center of the authority monopolizing power and capital. The far distant place from Tokyo was originally pioneered by the returnees who had been once deceived to settle in Manchuria by Imperial Japan. They were exploited as accomplice of imperialist aggression to Asia during the period of Asia-Pacific War. When Soviet troops made entry into the war, they were abandoned in final. Including the persons returning from Sakhalin, the people having been barely able to return to Japan could settle in Rokkasho village after the war. And in the 1960's when Japan achieved the high economic growth, this place was involved in the gigantic "development" project of the Mutsu-ogawara Comprehensive Development as location site of steel and oil-refinery plants which were hated as pollution industries and difficult to build in the central region of Japan. Many big businesses came there, and tried to buy up lands crazily by heating up the propaganda of the government for "remodeling the Japan's islands." The first oil shocks in the 1970's, however, broke out that project in recession and only oil tanks of 84 million liters for reserve base are seen at present. The next stage was the project that aimed at construction of nuclear base from the 1980's. In 1985, the local governments of Rokkasho village and Aomori prefecture concluded the agreement for building up several nuclear facilities with the electric power world. Thus, the gigantic nuclear complex in the village symbolizes the discriminated center-periphery relation formed by the authority of Japan in modern history.

There are annually about 900 tons of used nuclear fuel sticks from 54 operating nuclear power plants of 4.9 million kw output in total and about 25,000 tons of them piled up to the year of 2008.^{ix} The expected ability of reprocess of them in the facility of Rokkasho village is announced 800 tons annually operating for 40 years. However, its capacity is quite smaller comparing with their amount of piling up. Moreover, the cost for reprocess is accounted for 400 million yen per ton, twice of that of the reprocessing facilities in Britain and France. This is the same case as the Monju. The bad cost-performance of Rokkasho's facilities has clearly shown us their extravagance. The most worried issue is on the scheme of storage and "final" disposal of nuclear wastes. Especially, the difficulty of disposal of high-level ones cannot be solved with any modern technology. According to the proposed scheme, they are to be changed into solid state by mixing glasses, sealed in canisters and buried in the stratum of 300m underground after storing for 30-50 years for cooling. This scheme was planned by the Nuclear Waste Management Organization (NUMO), the governmental corporate body established in 2000. Though the NUMO aspires to accept the application from any local government that hopes to attract the site for "final" disposal in return for getting numerous subsidies (most of which must be paid from high-priced electricity use of Japanese citizens,) there is no local government to do so. It means the scheme of NUMO is almost impossible to achieve and, as the result, all nuclear wastes will stay at Rokkasho village forever, maybe.

By the way, the self-sufficient rate of power

^{ix} Nippon Denki Kyoukai Shinbun, *The Explanatory Booklet of Nuclear Reprocessing Factory*, 2008

generation in Tokyo metropolitan area was only about 10% and the rest was sent from the distant local regions such as Fukushima prefecture (26% of the total supply) or Niigata prefecture (19% of the total one) in 2008. Also, more than 80 % of the supply from both prefectures depended on nuclear power plants. We can see the irrational center-periphery structure in which “abundance” in the center is based on sacrifice from the periphery. It is violent practice that the government and big businesses have pressed the facilities of nuisance against local residents by ignoring their intentions or sentiments in the established unequal center-periphery power structure. Unsymmetrical relation of power politics between Tokyo and Rokkasho village can be applied to that between Tokyo with Okinawa. Under the name of “security of Japan,” Okinawa is also forced to be pressed against many American military bases by *the Tokyo*. Both destinies are dominated by and toyed with selfish conveniences of the authority. And two peripheries have been connected with the center by force under this keyword, nuclear power.

The earlier disasters from nuclear fuel reprocessing system could be seen in the facilities of Sellafield of Britain and La Hague of France. Scale of the exhausted radioactive materials from the reprocessing facility is incredibly bigger than that of nuclear power plant, say, 250 times of the latter. It is said that reprocessing facility exhausts large amount of radioactive materials per day which is accounted for same as that from one power plant for one year’s operation. Around the both facilities, there often happened leakage of radioactive materials, pollution of sea and increase of infant leukemia. So, it is quite natural that we can worry about severe nuclear disaster in Rokkasho village.

Though the test operation of reprocess started on March 2006, so many troubles on the process of mixing nuclear wastes with glass into solid matter had happened and the operation was often obliged to stop since then. On January, 2009, radioactive waste water of 149 ℓ leaked into outside and polluted around the facility. For this reason, the full operation of the facility is postponed to 2012. In addition, for fearing of happening of “nuclear hijack,” the region around the facility was strictly guarded and even the authority adds some pressure to the residents those who oppose to its operation. The local communities have been divided into the group of approval and that of opposition and they are finally taken down.

Thus, the present situation of Rokkasho village inspires us the landscape of nuclear society coming in the near future which must be the end-stop of plutonium-road.

7. The Era of Globalization of Nuclear Business from Japan

Since the first operation of nuclear reactor at Tokai village, Ibaraki prefecture in 1966, about one-third of power generation is occupied by atomic energy in Japan. The tendency of dependence on nuclear power will increase, and 42% of its total output of 1.1 trillion kwh will be supplied by nuclear power plants by 2017, according to the data of the Japanese power businesses. (See Table2, but I must take note that their forecast is based on their favorite anticipation for promoting development of nuclear power plant. We should not swallow the data without any doubt.) Based on this forecast, at present, more than 14 reactors are projected to build for making up the increased demand and abolition of old reactors by 2030. Why does the

Table 2. Power Generation in Japan and Shift of Origin [Year:1980-2017 (including forecast)]

Year	Volume of power generation of the year (Billion Kwh)	Contents of origin (%)					
		Atomic	Oil etc.	Coal	LPG	Water	Others
1980	485.0	17	46	5	15	17	0
1985	584.0	27	27	10	22	14	0
1990	737.6	27	29	10	22	12	0
1995	855.7	34	20	14	22	10	0
2000	939.6	34	10	16	26	10	1
2005	988.9	31	11	25	24	8	1
2007	1,030.3	26	13	25	27	8	1
2012 (f.)	1,059.4	37	7	21	25	9	1
2017 (f.)	1,103.4	42	5	21	22	9	1

Source: *Denki Jigyo Rengoukai of Japan, 2009 *Interest group of Japan's oligopolistic electric power companies

authority recklessly push forward to construct nuclear power plant in spite of growing citizens' doubts and inefficiency of them?

The biggest reason of it is the fact that construction of nuclear power plant is big business chance for itself. For example, total cost for constructing one LWR whose output has 1 million kw is estimated at least 40 million yen. For getting bigger share of profits from the "public project," Japanese big nuclear business groups such as Toshiba, Hitachi or Mitsubishi and other many medium, small-sized companies make efforts to participate in it. On the other, the local government inviting nuclear power plant can also secure big subsidies which are covered by tax-income of the central government and a certain proportion of electricity charge of Japanese users through electric power companies. Moreover, it can get fixed property tax and corporation tax from the operating plant, though they must decrease in years as the result of its depreciation. So, once permitting to

invite nuclear power plant and being dependent its budget on, the local government cannot help asking for new invitation of it because its life is prospected about 40-50 years at most. As the result, most of the local governments having nuclear power plant cannot escape from this vicious chain of power politics, i.e., the mechanism of "nuclear colonization." In the present Japanese society in which so-called "peaceful use" of nuclear energy has been developed for more than 40 years, the profit-share system on nuclear businesses is established firmly. It is formed through organization of complicated business hierarchy from big businesses to local small firms that cluster together around enormous budget on nuclear power development. It means the fact that Japan's nuclear industry is a chunk of profit and it cannot maintain the profit-share system or survive without inducing big money. It is tremendously irrational and contradictory issue for the ordinary citizens.

Well, how can we consider the recent trend

Table 3. Nuclear Power Plants in Asian Nations (As of Jan. 2008)

	Number of Nuclear Power Plant in Operation	Rate of Nuclear Power Generation of the Total (%)	Present Situation
China	11 (Zhenjiang, Jiangsu, Guangton province etc.)	2	5 in construction (Zhenjiang, Liaoning, Shandong, Fujian province etc.) and 35 projected
Taiwan	6	17	2 in construction,
South Korea	20	37	4 in construction and 4 projected
Vietnam	-	-	14 projected by 2030, 4 constructions of them were concluded in 2010, and 2 orders of them were accepted by Japanese consortium
India	17	3	6 on construction

Source: *Denki Jigyo Rengoukai of Japan, 2009

that Japanese nuclear businesses strengthening contradictory social structure are about to globalize by means of export-scheme of power plants with support of the authority? The biggest target of their marketing is doubtlessly the emerging nations in Asian region where Japanese big businesses have already deployed their sales in competition with the US or Korean enterprises. According to the projections of Asian countries, many nuclear power plants are planned in the near future. (See Table 3) China, for example, prospects to increase power output 189 millions kwh in 2025 from that of 9 millions kwh in 2009. For achieving the goal, the Chinese government has big project to construct 60-70 nuclear power plants sustaining its rapid economic growth by investing 63.5 trillion yen from now on. And in India, 4,800 kwh power supply will be needed to cope with the growing demand in 2025 comparing with that of 2,200 kwh supply in 2010. Also, according to the Indian government, more than 20 nuclear reactors are projected to construct and the total budget of it is estimated 13.6 trillions yen. In this circumstance, the

Japanese government has moved to conclude the civil nuclear agreement with India for promoting export of nuclear reactors and technologies concerned as the US, France, Russia and Canada did. But India does not participate in the scheme of the Nuclear Non-Proliferation Treaty (NPT) forbidding the nuclear-armed countries to spread nuclear weapons abroad and giving them obligation of their disarmaments, though India is one of them. The transfer of Japan's nuclear technologies for civil use might increase the risk of diversion into military use and lead finally to spread nuclear weapons in the world. We are afraid of the near future in which globalizing of nuclear businesses led by Japan, the country experienced nuclear catastrophes in past, may take hostile action against international efforts of the people for establishing nuclear-free world.

However, the Japanese enterprises of nuclear power plants have already developed their global business. Toshiba that bought out Westinghouse Electric (WH), pioneer enterprise of the Pressured Water Reactor (RWR), has formed joint-venture

with Ishikawajima-Harima Heavy Industries or IHI and projected to receive orders of 39 reactors by 2015 in global market. Another giant, Hitachi established joint-venture with General Electric (GE), pioneer of the Boiled Water Reactor (BWR) and Mitsubishi Heavy Industries formed coalition with Areva of France, one of the biggest conglomerates of atomic energy industries in the world, deployed their global marketing. These business groups are supported by the Japanese government. The businesses of nuclear power plants, electric power companies and the government consented to establish the International Nuclear Development of Japan Co. Ltd (INDJ), the comprehensive and totalitarian organization for promoting global marketing of nuclear businesses in 2010. At present, they are infiltrating into Vietnam, Thailand, Saudi Arabia, India, South Africa etc., supported by diplomatic efforts of the Japanese government.

On June, 2010, the ministry meeting of energy of the Asia-Pacific Economic Cooperation (APEC) was held at Fukui city in Japan and pronounced the joint statement appealing on the development of nuclear power plants that would have little amount of CO₂ exhaust initiated by the Japanese government. But it intentionally ignored the worry about increasing nuclear wastes or spreading nuclear armament. How can we consider on the issue that global expansion of nuclear power plants might possibly cause many severe disasters and increase the Hibakusha or victims of exposed radiation like native Americans, Aborigines or indigenous Australians sacrificed by uranium mining or Iraqi,

Afghan children damaged by depleted uranium ammunitions as well as victims of *the Hiroshima* and *the Nagasaki* under the name of “peaceful use?” Moreover, the Japanese government has even negotiated with the Mongolian government for “exporting” its nuclear wastes by making contract for burying them underground of Eurasian continent.^x Increasing plutonium and expanding nuclear business in the global stage might bring big threat of nuclear terrors to the people in the world from Japan.

8. Atomic Empire Emerging Beyond the “Plutonium Road”

We have reviewed the history of “plutonium road” that a few micrograms of plutonium in the beginning of the 1940’s increased rapidly during 70 years. We can say that the latter half of the 20th century was the era that human being had stepped in plutonium society. Today, plutonium exists not only in more than 20,000 nuclear warheads but also in nuclear reactors. It is said that one ordinary reactor of LWR having 1 million kw capacity of output can produce about 200-250 kg of plutonium in a year, and as the critical mass for fission of ²³⁹Pu is to be estimated as 5-9 kg. So, Japan can have much plutonium enough to produce more than 2,000 Nagasaki-typed A-bombs annually. According to the annual paper of JNC, Japan has possessed 139.4 tons of plutonium (including 45t returned from reprocessed ones with wastes from Britain and France) by December, 2007. In short, Japan has become nuclear society surrounded by vast

^x According to the Japanese newspaper *Mainichi* dated on May 9, 2010, the Japanese government has schemed to construct “final disposal” facility of nuclear wastes exhausted from domestic nuclear power plants on the plain of Mongolia. The Mongolian government may approve to start the negotiation on this issue. This is nothing but the dangerous attempt to export nuclear wastes abroad from Japan. Does it mean Japanese citizens inevitably occupy the seat of accomplice in nuclear disasters on abroad?

amount of plutonium. And it cannot but shift to be more authoritarian regime so that it can secure social safety for preventing nuclear disasters from any accident by the authority.

Maybe, the biggest “obstacle” for securing safety of the nuclear society will be human existence itself. I mean, there include not only workers or engineers who might commit unexpected human errors, but also critical citizens who oppose to operations of nuclear reactors or appeal their abolition in public. From the political standpoint of the authority dominating over nuclear society, the latter should be very tremendous, because they are regarded as “potential element of danger.” Under increasing pressure for fear of nuclear terrors, the emerging nuclear society might incline into more authoritarian regime with totalitarian surveillance network to the citizens as we have already seen in the US society after *the September 11*, 2011. The society must change into worse in deepening dependence on atomic energy, where the livelihoods of citizens will be under the control of the authority in the pretext of safety management. So, the coming nuclear society will lead to deprive citizens of their human rights. As the result, those who oppose to nuclear power plants will be more alienated from their local communities and the increasing sociopolitical pressure will finally cause dismantle of the civil society, i.e., transformation to the “atomized human society.” More than 30 years ago, Robert Jungk alarmed this horrible trend of ethical or moral degradation and deprivation of democratic rights in deepening dependence on nuclear energy in his edition *Der Atom-Staat (Atomic Empire)* in 1977. In the edition, he criticized the degraded existence of human being in the “atomized human society” by introducing the

notion of “Homo-Atomics” or human existence as alienated, dismantled individuals under the control of the authority for securing his energy supply from nuclear power as bellow,

“...The authority will not only research any political interest of the residents but also try to get personal information on their characters or political trends. It is quite natural. Because, when some “accident” happened suddenly, it could find out the group giving a hiding place to the terrorists or participants of strike who might attack on nuclear facilities or materials. ...For fear of being regarded as subversive element, people becomes cautious in his conversation and dose not express his real intentions to anybody. For, his critics or uncommon behaviors might bring big disadvantage to him under constant surveillance. His freedom could be temporarily deprived in the happening of nuclear accident. In fact, any government using atomic energy and having nuclear facilities for industry is caught in a dilemma. If its security measures were regarded as too lenient, the government would be blamed as insufficient for securing the lives of citizens. But if the government considered the threat of nuclear terror were too serious, the state could not help changing into the police one. If the citizens permitted further development of atomic power, it would also mean for them to admit the pulling down of democratic rights and freedom step by step. ...At least for the purpose of developing nuclear use, to defend the nuclear facilities from citizens is as important as to defend citizens from them.” [Jungk, 1977]

Remind us of the gigantic “system of intellects” established in the Manhattan Project that could succeed in first nuclear fission in human history. Under the project, all processes such as from uranium enrichment to development of ignition

devices were carried out by the segmented and specialized sections of scientists and engineers under the strict control of the US authority. All experts concerned on the project were forcibly subordinated to the power and could not be allowed to make any contact among them under the name of keeping top secret of the state. On the other hand, the common citizens were not informed of the project and alienated from the process of decision making of the state. Thus, atomic energy is the awful material that symbolizes the terribleness of modern technologies and their substance of human alienation. There is no difference on the use of atomic power whatever military or “peaceful” one. Atomic Empire has emerged on the ground of distorted sociopolitical situation in which the strong authoritarianism for securing on atomic energy has broken down the citizens’ solidarity and public interests. Beyond the “plutonium road,” we can see horrible future of human being.

9. Conclusion:

“Philosophy of Darkness” and Interests of Global Citizens for Nuclear-Free World

The international studies, my major, should take an academic function to elucidate the relationship, connections or associations among global citizens and develop intellectual movements for establishing better global community with confrontation against the contradictions or irrationalities in the contemporary world. Therefore, I should express my antipathy against emerging menace of “plutonium society” and criticize the present trend of social transformation stepping into the “plutonium-road” to which I mentioned.

It is not difficult for us to realize the biggest contradiction that so-called “abundant” livelihoods

in the center are established under sacrifice of the people in the peripheries. For example, economic activities of the Tokyo metropolitan area cannot be kept without pushing nuclear wastes causing threat of radiation exposure to the local residents distant from it. Also, we are afraid that Japanese businesses for exporting nuclear reactors may possibly cause dangerous diffusion of nuclear armament to the Third World. These center-periphery relations that have caused many contradictory global issues are sustained by unsymmetrical power balance. So, they must be essence of all difficulties we face up to, and the hardships must be strengthened in the landscape beyond across the “plutonium road” we are stepping into. Like the colonial rule of Greater Imperial Japan was defeated by the liberation struggles of Asian peoples and its regime collapsed in 1945, the emerging nuclear society of Japan cannot be sustainable and eternal.

The basic ideology of nuclear society is to continue unlimited waste of resources and dependent on authoritarian control for securing his “abundant” livelihood even if the danger of radiation remains for several hundred thousands years. But it is clear that the wasteful lifestyle cannot sustain his safety of life any more. The center-peripheral relation built in the nuclear society is based on the sociopolitical inequality implying not only discrimination in space that the nuclear businesses in metropolitan economy force big burden to the local residents but also in time that the present generations seeking for short-term “abundance” force long-term threat of radioactive pollution to the next generations. In this context, we must have radical doubt about the contents of our present “abundant” livelihoods. Is it the true “abundant” society that we have been indulged in? And is it the true

“happiness” that we have sought for etc.? In the developing atomic society, the numbers of Hibakusha or the victims of nuclear harm have also increased globally. Natives Americans, Aboligines or indigenous Australians contained in the reserves, for example, have been forcibly exposed to radiation from mines of uranium ore. Or, many children have also added to Hibakusha by air and water pollution of radiation infiltrated by the bombardment of depleted uranium ammunitions in Iraq or Afghanistan. Starting from Hiroshima and Nagasaki, the disastrous nuclear harms are globalizing and increasing the menace of death to human being. However, this tendency is nothing but the result that the authorities and big businesses have formed the structural violence and trampled on the rights of the local residents in peripheries under the name of stable security of energy supply or of establishment of infinite freedom. It is no doubt that the operations of nuclear reactors and the nuclear reprocessing facilities in Japan must work as oppressing devices of the structural violence and increase Hibakusha, as well as globalizing Japan’ nuclear businesses will do in the global stage.

We must realize that these crimes are executed as “national policy” for the purpose of achieving “public interests.” To our strange, however, the authority seldom explains concrete contents, social cost and demerits of the proposed “public interests” to the local residents, nor their essential significances are checked by themselves. In fact, they are nothing but devices of structural violence. The legitimacy of “public interests” has just depended on the fact that they are executed by the authority whatever their contents may be. Same as counter-attack of *the September 11* was justified as “public

interest” and supported by many American citizens, for example, the development policies of nuclear power plants in small-resourced Japan can be easily accepted as doubtless social justice for achieving “public interest” which can supply enough power to secure “abundant” Japanese livelihoods though they ignore vast expense of the local residents’ interests. For the local communities, they are just obliged to accept nuclear wastes and worry about nuclear disasters. This type of the logic posing state priority on “public interest” seems to be very negative and reactionary because it just forces the weak people to be sacrificed for the sake of interests of the strong in the existing sociopolitical framework. And generalization of the negative logic on “public interest” like this will finally lead us to be dismantled individuals suppressed the basic principles of civil society such as seeking for co-existence or cooperative livelihoods of global citizens.

Concerning on international studies as intellectual movement for establishing better global citizens’ communities, we should warn and advocate taking actions for countering to the negative logic on “public interest” organized by the authorities. Denying the irrationality that one cannot acquire his “abundance” without sacrificing the others and reconfirming of the importance of cooperative lifestyle identified as global citizens, we should pursue the alternative “public interests” established on the principle of joint-self help. For achieving it, we firstly make efforts to change and even give up the present unsustainable lifestyle wasting vast amount of energy resources and forcing risks to the others. Several significant suggestions were given in the anti-pollution citizens’ movements in Japan during the period of the 1970’s. For example, in the resi-

dents' movement against the Buzen thermal power plant in Oita prefecture then, Ryuichi Matsushita, a leader of the movement, tofu maker and famous novelist, came to sublimate his anti-pollution sentiment into a critical philosophy on lifestyle in modern civilization. We can memorize it as "philosophy of darkness." At that time, to suppress the residents' movement, the electric company arrogantly insisted, "Your protest is just a local egoism in spite of taking merits from electricity. If you continue to disturb us, we can stop supply of electricity to your home." To fight against the oppression, Matsushita and his colleagues dared to set up "the day of blackout" or "the day of darkness," and they intentionally turned off lights in each home looking up at the twinkle stars in night together. Through the movement, they could raise their solidarity. And ideologically, Matsushita reached high place of philosophy that public consciousness had to be established only by citizens' hands not by the authority's decision. In his edition, he insisted on "philosophy of darkness" as bellow,

"...The electric power companies and the so-called sensible persons try to justify pollution saying that electricity is indispensable for better cultural life of the people absolutely. Through this pretext, they can force a small part of local residents to endure the damage of pollution. But, I think the "cultural lifestyle" itself should be reconsidered, if it cannot be sustained without giving serious health damage to the others. Several people criticize me that we have to go back to the Edo-era having no electricity in past if I resist constructing any thermal power plant. This is too simplistic thinking though whenever they say. I do not say we need not electric power at all. Rather, I insist that we had better renovate our lifestyle enough to sustain under the present level of power supply. The

word such as "development" or "advance" is always used as catch-phrase of good thing for the future. But is it a good thing truly? Contrary to this theory based on urban-oriented modernization, the basis of our anti-development theory should stand on "philosophy of darkness," which respects to our native places and fondly remembers of darkness in villages. At first, we should break down the myth of modern civilization that we need limitless energy and electric power. It is possible by means of imposing us limit to growth, as well as reflecting on the contents of our present "cultural lifestyle" radically. As a simple method, we can set up the day of blackout periodically. This is not a joke at all." [Matsushita, 1999]

Matsushita's message is very meaningful for us in the era of globalization of nuclear businesses and Hibakusha. For the purpose of establishing nuclear-free world, we, global citizens have to reconsider our way of life depending on wasteful consumption of energy resources. Our principles are quite simple. We reject to indulge ourselves in "abundant" livelihoods by sacrificing the others' lives. The "abundance" like that is humbug. We should stand up to any structural violence such as pressing nuclear wastes to the local residents and the next generations or making further global spread of nuclear weapons. We would not be deceived any more by the myth that we need limitless amount of atomic energy for the future.

See Table 1 again. Even though the given data is rather favorable for nuclear power use intentionally because it was released by the oligopolistic Japanese electric power companies promoting nuclear businesses, it is clear from it that we can reject our dependence on nuclear power any more if only our consumption level of electricity can go back to that of the 1990's. Of course, prevalence of

renewable natural energies as substitute for atomic power and energy conservative consumer goods can contribute to raise our target of power cut than we can imagine. In short, our efforts for freeing from atomic power are achievable. For changing our wasteful lifestyle which possibly causes destructive damage of global environment, we will step into the reorganization of social system on energy management and production, i.e., transformation from the contemporary oligopolistic and center-controlled power generation system to more independent and decentralized one controlled by the hands of local citizens should be essential.

Recognizing the fact that plutonium is the material having big menace for strengthening the established structural violence as well as that of destruction of global environment, we will need to have imagination for the dangerous future being deeply dependent on plutonium use, where the society will be under the horribly totalitarian regime. Also, reminds us of the fact that plutonium is high toxic and easy to use as nuclear weapons. So-called “peaceful use” has always high risk of swinging back to military one. In case of Japan, a slight protection wall against this backward is the Basic Law of Atoms established in 1955. It was quite natural that the law prescribed three essential principles for Japanese nuclear use as democratic procedures, public openness of information concerning on and self-determination of it in consideration of the fact that Japan had experienced big nuclear disasters in Hiroshima and Nagasaki and declared pacifism in the constitution. The principle of public openness of information principle, above all, must be indispensable security of citizens for managing and containing nuclear power by themselves. The increasing nuclear reactors,

however, have strengthened to build up secrecy regime in Japanese society. For example, we had never been informed of exact situations of the nuclear power plants when some accident happened in it, even though some of them might be in the severe stage. Moreover, the tendency of increasing secrecy is developing under the name of necessity of risk management against nuclear terrorism. Recent maneuvers of nuclear businesses such as restart of the FBR Monju or operations of nuclear facilities in Rokkasho village will show that Japan has become potential nuclear power in international community and enlarge the plutonium road that we have stepped in.

Now the time has come. We must stop here and seek for alternative way to the nuclear-free world. Our wisdom for achieving it can be found out in the way of thinking for respecting global citizenship, paying our attention to the suffering people in peripheries and organizing our movement to establish new concept on global citizenship in cooperation with the people who have concerned on abolishing the plutonium road we are confronting.

Reference

- Aczel D. A. , *Uranium Wars*, 2009
- Churchill W., *The Second World War, the 6th edition*, 1952
- Commoner B., *Poverty of Power, Energy and the Economic Crisis*, 1976
- Denki Jigyo Rengoukai of Japan *Atomic Power 2009 Consensus*, 2009
- Group Gendai, *Rokkasho Village Rhapsody*, 2007(movie scenario)
- Hirose Tkashi, *On the Prospect of Movement Opposing to the Nuclear Facilities in Rokkasho*

Village, 2008

Japan Nuclear Committee (JNC), *Annual White Paper*, 2010

Japan Nuclear Fuel Limited (JNFL), *Outline on the Facilities of Nuclear Fuel Cycle*, 2010

Jungk R., *Der Atom-Staat*, 1977

Matsushita Ryuichi, *Kurayami no Shisou (Philosophy of Darkness)*, revised edition, 1999

Takagi Jinzaburo, *Writings 1-10*, 2001~2004

Materials of the Hiroshima Peace Memorial Museum

Materials of the Nagasaki Atomic Bomb Museum