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Breakfast Meeting at the Heritage Foundation.

Thomas Countryman, the former Acting Under Secretary for Arms Control and International Security, addresses a symposium at CSIS.

Report:

Japanese Delegation visits US to discuss plutonium stockpile and US-Japan 123 Agreement

From September 10 through 15, CNIC, together with Tokyo-based think tank New Diplomacy Initiative, organized a delegation of Diet Members and experts to visit the United States in order to draw attention to the problem of Japan's plutonium policy. With the US-Japan Nuclear Cooperation Agreement (commonly known as the '123 Agreement'), which allows Japan to reprocess spent fuel and separate plutonium, coming to the end of its 30 year period of validity next July, we aimed to take advantage of this timing to stimulate discussion and alert US lawmakers to this issue.

The stated aims of the delegation were as follows:

1) Debate the merits and demerits of operating the Rokkasho Reprocessing Plant. Japan has not put forward a plan based on concrete figures to reduce its plutonium, and the realistic prospects of restarting MOX reactors and completing the construction of the Ohma Reactor are uncertain. In this context, can we explore the option of indefinite postponement of Rokkasho operations?

2) Form US-Japan joint committees, stipulated in the 123 Agreement, of members with diverse backgrounds and discuss the following points (also considering the option of Track 2 dialogue for the same objectives):

2.1) Can we conduct comprehensive discussions on the impact of Japan's Rokkasho Reprocessing Plant on future reprocessing policies of South Korea and China and the impact of the plutonium stockpile on regional and international security and stability, as well as nuclear security?

2.2) As America's plan to dispose of plutonium through MOX fuel has become derailed, and Japan also has excess plutonium, should both countries cooperate to investigate technical aspects of plutonium disposition methods, in order to reduce proliferation risk?

Contents

The delegation members were (left to right in the photo): Caitlin Stronell (CNIC), Taichi Kuboki (NDI), Hajime Mikami (former Mayor of Kosai in Shizuoka Prefecture), Kiyohiko Yamada (Secretary-General for plaintiffs in court case against nuclear fuel cycle), Hajime Matsukubo (CNIC), Masashi Adachi (Member, House of Councillors, Liberal Democratic Party), Seiji Ohsaka (Member, House of Representatives, Democratic Party), Masakatsu Ota (Visiting Professor at Waseda & Nagasaki Universities), Sayo Saruta (Attorney at Law/Director of New Diplomacy Initiative), Ryoichi Hattori (Former member of House of Representatives, Social Democratic Party), Kensuke Koito (Mr. Hattori's assistant). As well, Aileen Mioko Smith from Green Action attended as interpreter.

It was a truly bipartisan delegation, and members held a variety of views on the larger issues of nuclear energy, but our common point of agreement was that the government's reprocessing policy must not be allowed to continue in its present form without an open, realistic review of the current situation and concrete plans to reduce the 47-ton plutonium stockpile, and certainly not to increase the stockpile by 8 tons a year by starting up Rokkasho Reprocessing Plant.

Over four days we attended three round table discussions at major think tanks in Washington such as Brookings and the Mansfield Foundation. We also attended a breakfast meeting at the more conservative Heritage Foundation as well as a Lunch Meeting in the House Foreign Relations Committee Room organized by the Nonproliferation Policy Education Center.

All of the above events were closed to the public and the media to enable frank discussions with high-level experts, but we also participated in a public symposium organized by the Center for Strategic and International Studies (CSIS). On the panel were the two Japanese Diet Members from the delegation and two US Experts, Thomas Countryman, the former Acting Under Secretary for Arms Control and International Security and Jon Wolfsthal, Senior Advisor at Global Zero. Countryman made several public comments during his time in office regarding US concern about Japan's plutonium stockpile and his speech in this symposium was quite specific, stating that Japan's international credibility as a non-proliferation advocate was at stake. He agreed that the 123 Agreement itself would not be challenged by either side, and would be automatically renewed but that still this was a good time to draw attention to the issue and that there are other ways Japan could commit to not holding unusable plutonium, such as a bilateral agreement to that effect. This agreement should also include a provision to operate Rokkasho only if there are realistic plans for all the plutonium it produces to be burnt in MOX fuel. Countryman also commented on the economic problems that maintaining the nuclear fuel cycle may create. If the rest of the world moves towards cheaper energy but Japan insists on pursuing this vastly more expensive form of energy generation, it may affect the competitiveness of the Japanese economy. He did also say, though, that energy issues must be decided by Japan and not dictated by the US, especially not by retired US officials!

Apart from these larger events, we also met individually with the staffers of 8 Senators and 20 House Representatives and in 4 cases the Senator or Congressman/woman was also present for the meeting. Many of the staffers we met with had studied the issues and shared our concerns that Japan's plutonium stockpile aggravated proliferation fears in our region, which is indeed an issue that the United States should be concerned about. In many cases our discussions moved to concrete ways the US Congress could raise concern about this issue within the US government and which would put pressure on the Japanese government to behave as a responsible nation and regional leader as well as boost its non-proliferation credibility in the international community.

Our packed schedule over four days certainly enabled the delegation to have fruitful discussions and exchange information with many people. We made several important connections which we will be working very hard to mobilize and coordinate. These kinds of partnerships are vital in order to put as much pressure, from as many different channels as possible, on the Japanese government to make its plutonium policy open and accountable.

<Caitlin Stronell, CNIC>

Reference Material:

Japan's Separated Plutonium Inventory (as of end of 2016)

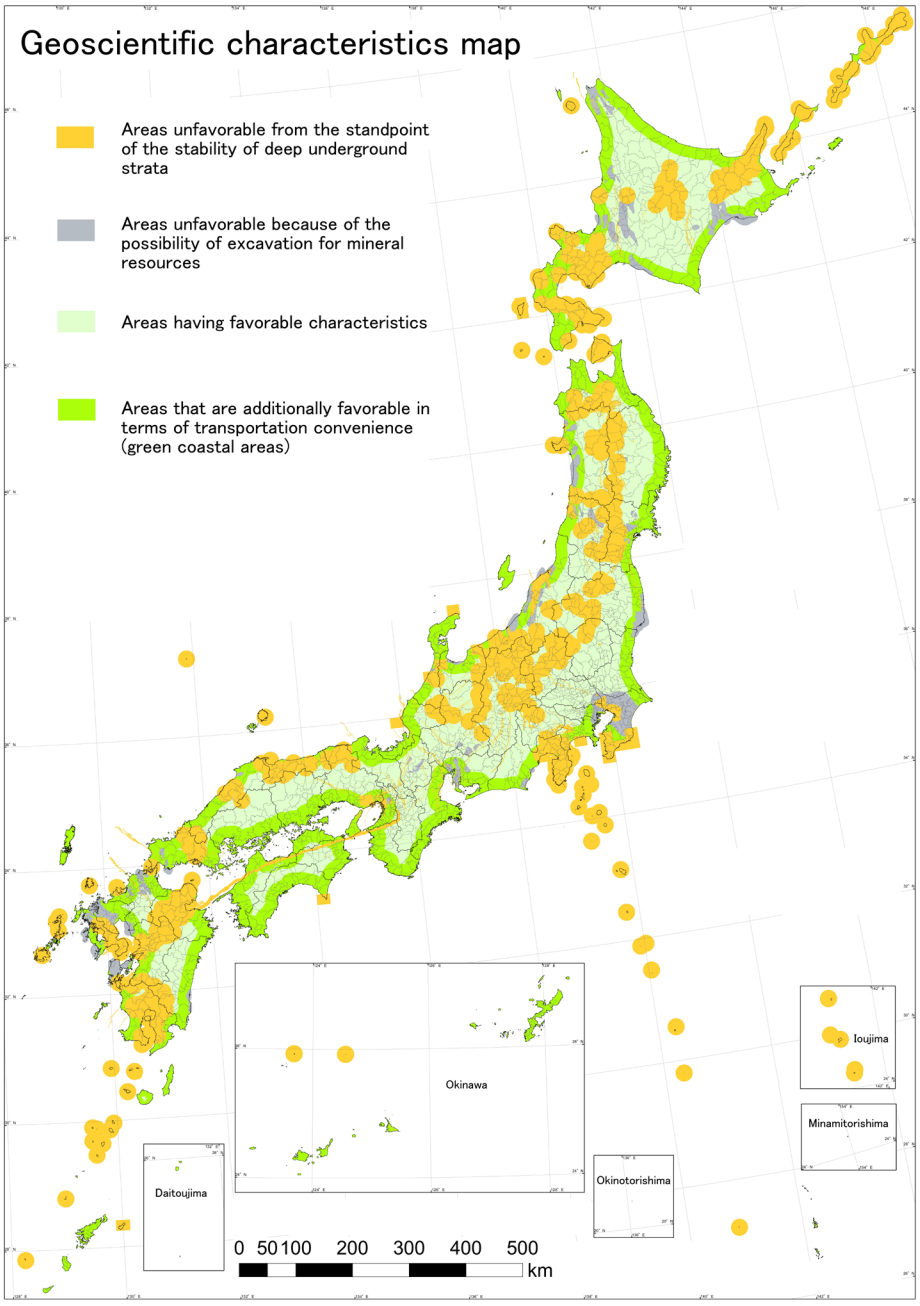
On August 1 2017, Japan's Nuclear Safety Commission released data on plutonium storage conditions as of the end of 2016. The International Atomic Energy Agency (IAEA) revised its evaluation methods for unirradiated plutonium in September 2016, bringing to light 251 kg of unirradiated plutonium that had been loaded into the Monju reactor. Specifically, the evaluation method was revised to include unirradiated plutonium loaded into nuclear reactors in addition to other plutonium accounted for previously, with the objective of making the assessment of civil unirradiated plutonium holdings clearer under the IAEA's International Plutonium Management Guidelines. After the criticality test operation of Monju in May 2010, the fuel was exchanged. It has remained there to this day with no operations resuming (and the decision made to decommission the reactor), so the unirradiated amount inside the reactor will now be accounted for.

Also, 331 kg of plutonium that was part of a 444 kg criticality test apparatus was transferred to the Savannah River National Laboratory in March 2016, so the amount has decreased.

The total amount of plutonium in Japan has decreased by about one ton due to irradiation of MOX fuel starting with the resumption of operations at Takahama Units 3 and 4. This can be determined from differences in amounts held in commercial nuclear power reactors.

Japanese Separated Plutonium Holdings 2012-2016 (kg)

		2012		2013		2014		2015		2016	
Separated plutonium held in Japan		JNFL	JAEA	JNFL	JAEA	JNFL	JAEA	JNFL	JAEA	JNFL	JAEA
Tokai Reprocessing Plant	plutonium nitrate	283	668	283	664	284	577	285	266	276	27
	plutonium oxide	3,329	83	3,329	84	3,329	131	3,329	246	3,329	281
	Total	3,612	751	3,611	748	3,613	709	3,614	512	3,604	309
	Total Fissile Plutonium	2,348	498	2,347	496	2,348	467	2,348	336	2,342	202
	Onsite increase/decrease	1	-1	-1	-3	2	-39	1	-196	-10	-203
MOX Fuel Fabrication Plant	plutonium oxide		1,939		1,937		1,974		2,150		2,423
	testing and fabrication stage		978		981		983		999		936
	fabricated fuel		446		446		446		446		446
	Total		3,364		3,364		3,404		3,596		3,805
	Total Fissile Plutonium		2,333		2,333		2,361		2,490		2,627
	Onsite increase/decrease		1		0		40		192		209
In Nuclear Reactors	Joyo	134		134		134		134		134	
	Monju	31		31		31		31		282	
	power reactors in use	959		2,501		2,501		2,501		1,597	
	research & development	444		444		444		444		113	
	Total	1,568		3,109		3,109		3,109		2,126	
	Total Fissile Plutonium	1,136		2,133		2,133		2,133		1,434	
TOTAL		9,265		10,833		10,835		10,832		9,844	
TOTAL FISSILE PLUTONIUM		6,315		7,309		7,310		7,307		6,605	
Separated plutonium held overseas											
Overseas	UK	17,052		20,002		20,696		20,868		20,839	
	France	17,895		16,310		16,278		16,248		16,217	
	Total	34,946		36,312		36,974		37,115		37,056	
	UK: Fissile Plutonium	11,622		13,526		13,939		14,032		14,003	
	France: Fissile Plutonium	11,655		10,604		10,572		10,542		10,513	
	Total Fissile Plutonium	23,277		24,130		24,511		24,574		24,516	
GRAND TOTAL		44,241		47,145		47,809		47,947		46,900	



Compiled from the Ministry of Economy, Trade and Industry (METI) website http://www.enecho.meti.go.jp/category/electricity_and_gas/nuclear/rw/kagakutekitokuseimap

Government releases a geoscientific characteristics map showing areas "suitable" for disposal of high-level nuclear waste

Will the map push the HLW disposal site selection process forward?

On July 28, 2017, the Japanese government released a geoscientific characteristics map to provide a basis for selecting locations for high-level nuclear-waste disposal sites. The map, on a 1:2,000,000 scale, shows the entire Japanese archipelago, accompanied by five aerial maps. The explanations of the standpoints used to evaluate aerial favorability for site construction are provided, along with the criteria for those standpoints, accompanied by the maps, which use color-coding to indicate individual standpoints.

The characteristics map divides the nation into four colors. The areas unfavorable from the standpoint of the stability of deep underground strata are colored in orange; the areas unfavorable because of the possibility of excavation for mineral resources in silver; the areas having favorable characteristics in pale green; and the areas that are additionally favorable in terms of transportation convenience in dark green (these areas are called green coastal areas).

In Japan, an act concerning the deep geological disposal of high-level nuclear wastes was established in 2000. It stipulates the methods of selecting disposal sites based on a stepwise approach, and the Nuclear Waste Management Organization (NUMO) was established as the organization that is taking the initiative in selecting the sites and carrying out the disposal process. The stepwise approach consists of three steps; a literature survey, a general survey, and

a detailed survey. NUMO, established mainly by electric power companies, encouraged municipalities across the nation (about 3,500 in total at that time) to apply for a literature survey.

However, all the municipalities that showed an interest in application later abandoned the idea due to strong protest. In 2007, Toyo Town, Kochi Prefecture, which was the only municipality that managed to submit an application, was obliged to withdraw it because of strong protest that demanded the recall of the town mayor. After this event, the government judged that the site selection process would not go forward if it continued to wait passively for applications, and thus adopted a second approach for use in parallel to the passive approach — it decided to look for municipalities and encourage them to apply for a literature survey.

Thereafter the government used every opportunity to exchange opinions with many municipalities, and in spring 2011, it was prepared to request about 10 municipalities which had showed an interest to accept a literature survey. However, the Fukushima Daiichi NPS accident occurred immediately before the delivery of the request. The government became unable to pursue this plan any further, and the entire attempt to encourage municipalities to apply collapsed. The municipalities' interest had been attracted by government money, which were to be paid in return for their acceptance of the survey. After the Fukushima Daiichi accident, public criticism against nuclear power increased. Under such conditions, the government realized that gaining municipalities' interest would not be sufficient and that it would be necessary to show scientific reasons to justify the survey. In 2013, the government devised another approach, which was firstly to show the geoscientific characteristics of individual areas, secondly to identify the areas that could possibly host a disposal site, and thirdly to encourage municipalities that might be interested to accept a literature survey. It was the first time the government had adopted such an attempt.

The geoscientific characteristics map was created in this context. The map color codes indicate the areas judged unfavorable from a set of standpoints — volcanic activity, fault activity, upheaval, denudation, geothermal activity, bedrock hardness, the ranges influenced by pyroclastic flows, and prospective mineral resources. The areas judged favorable in terms of transportation (about 20 km from the shore) are also color-coded. Based on these standpoints, the archipelago is color-coded in four colors. The geological conditions specific to each area will be examined in the literature survey, with reference to geological records, while the characteristics map shows the divisions based only on the information available nationwide. Therefore, while the map is called a geoscientific characteristics map, the characteristics specific to individual areas are not always reflected. As an example, the map is supposed to exclude areas having pyroclastic flow deposits younger than 10,000 years as not favorable, but the map does not consider the range of influence of the pyroclastic flow from a possible eruption of the Kikai Caldera Volcano, Kagoshima Prefecture, the most recent eruption of which was 7,300 years ago. This influence will be considered in the literature survey. Many areas in Tokyo are classified in the green coastal areas, but because the Kanto Plain was formed during the Quaternary period, the bedrock is still soft deep underground, and there may be many unlithified rocks. This should also be considered in the literature survey.

This geoscientific characteristics map does not consider restraints in the use of land due to legislation or international treaties, nor social conditions such as population density and the number of landowners.

NUMO's conventional conditions for the acceptance of survey applications were only volcanic activity and fault activity. The other standpoints are included in the social characteristics map scheduled to be examined in the literature survey. Therefore, the release of the map is a step forward for the government. NUMO is modifying the acceptance conditions in order to be consistent with the conditions described in the map.

The Japanese archipelago lies in the tectonic movement zone, where four plates meet. Even if all the conditions presented in the map are satisfied, it would still be difficult to isolate wastes from the environment for more than 100,000 years. Especially, information on relatively large amounts of deep underground water, which should essentially be considered for long-term stability, is limited. The government intends to ensure the long-term safety of HLW by using engineering methods, and this governmental intention remains unchanged.

After the release of the geoscientific characteristics map, the government and NUMO intend to promote activities to gain public understanding, mainly in the areas whose characteristics have been judged favorable (green coastal areas). However, of the 47 prefectures nationwide, 20 prefectures have already turned down the survey. Citizens' movements against nuclear power generation have been powerful since the Fukushima Daiichi accident, and the movement strongly demands that all nuclear power plants be shut down first in order to halt the accumulation of HLW. The Science Council of Japan also stated that the upper limit of HLW should be determined (2012). However, the government and NUMO intend to promote the conventional concept and plan of geological waste disposal, separating the disposal site issue from the controversy of nuclear power plants. This head-on disagreement is expected to continue.

The government does not make efforts to form a participatory consensus concerning the treatment of HLW. As an example, consensus meetings or deliberative polls have not been conducted and are not planned. The government councils did not discuss

ways in which to obtain social agreement. What the government has attempted to do thus far is to try to earn public agreement for its geological disposal policy. However, what it has actually been engaged in is organizing gatherings that attempt to obtain public agreement for the government's plan, under the name of explanatory hearings.

The government's stance concerning the new characteristics map is that its release is not intended to persuade municipalities to accept a survey for disposal site selection; the government says that it will not initiate any survey unilaterally without gaining the agreement of the locals. According to the government, "this is the first step in a long road to realize final HLW disposal." NUMO plans to begin the first step by organizing dialog gatherings with a small number of people in the areas judged favorable from all the standpoints including transportation. NUMO said that it would release the schedule of dialog gatherings, but to date, it has not been released. It is not known when the schedule will be announced, but from October this year, the government and NUMO plan to hold explanatory hearings about the geoscientific characteristics map in 45 prefectures. With publicly invited participants, the gatherings will be used by the government to explain the map during the first half of the hearings, and during the second half the participants will be divided into small groups to exchange opinions with NUMO. Through this group dialog, NUMO expects to exploit human resources who can work proactively to invite the site to the area.

While the geoscientific characteristics map has been made public, when literature surveys will begin is unknown, and the issue of disposal site selection is expected to confront many problems.

<Hideyuki Ban, CNIC Co-Director>

Fukushima Now Part 1

The challenge of obtaining accurate air dose rate data in Fukushima

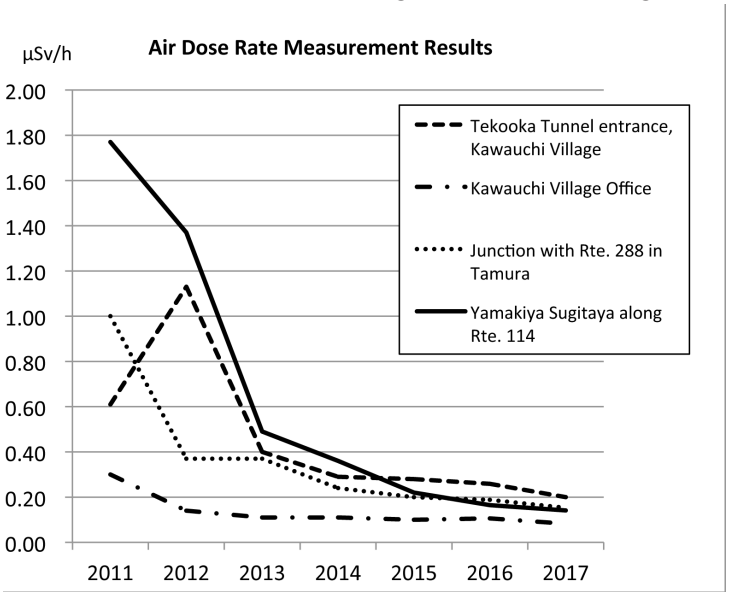
A citizens' survey team has conducted air dose rate surveys in Fukushima Prefecture starting from May 2011 at a pace of once a year. The date of departure to conduct the survey differs from year to year, with it being a two-day period this year on June 7 to 8. It is not a well-organized survey based on a set plan, but certain tendencies can be seen throughout the six-year period. Each year, measurements are taken at fixed points within a 20 km-wide range along National Routes 114 and 393 going from Fukushima City to Iwaki.

Our Air Dose Rate Surveys

In the first year, we attempted to conduct a survey, using GPS skirting the 20km line of the evacuation zone starting from the government's measurement point in Fukushima City, but got out-of-range indications on our mobile phones and had to settle for measurements every 3 kilometers. For the following year's measurements, we brought a dedicated GPS unit, but measurment error was too large to identify the government's sites. When we found landmarks, we photographed them for use in confirming our measurement points. That was good, but then they began prohibiting entry to the zones for which evacuation orders had been issued, and we became unable to enter the Tsushima district and other areas to take measurements where we had taken them the first year. Not only that, but traffic was cut off on the roadways, so to reach subsequent measurement points we were forced to detour for quite long distances. On the other hand, we were able to add some measurement points along the way. Of the seven points at which we were able to obtain measurements for all six years, four have been selected for the figure below. We used an Aloka TSC-171 survey meter, taking the average reading of three to five measurements (the number varied depending on the year). This is not the conventional way of taking measurements, but was done to prioritize the number of measurement points.

The readings declined greatly for the first two years, and this is thought to be the result of decontamination efforts. The higher reading at the Teko-oka Tunnel measurement point in the second year (dashed line in the figure) was the result of mistakenly taking the reading at the Iwaki-side entrance.

We became aware of having chosen the wrong



entrance when we were processing the data after taking the measurements the second year. That even such a minor difference in location can result in such a major difference in readings gives a sense of the degree of complexity of radioactive contamination.

When we visited in 2011, all of the residents had evacuated, leaving not a single soul in these towns and villages, which had reverted to complete silence as if they had been thinking, "We'd better drop everything else and just get out of here," they had left laundry hanging (though they'd moved it inside first), and their curtains were open. It looked like a their daily lives had frozen in time—an eerie scene, utterly still, devoid of any sign of the inhabitants, not even the twittering of birds. Now that the evacuation orders have been lifted, new houses are being built and cars can be seen in parking lots—signs of people about. A completely different atmosphere. This belies the fact, though, that only a tiny fraction of the inhabitants, at most one in 10, have returned. Nevertheless, I was surprised at what a difference just a few signs of people can make to the sense of a place.

The area known as Kawafusa in Odaka-ku, Minamisoma, which we visited after completing our air dose rate survey, had been a settlement with 72 households prior to the accident, but only five of those have returned so far. The residents are receiving government assistance to dismantle their old houses, so many of them are leaving their property as vacant land. Also, the four former elementary schools in Odaka-ku have merged into one. Even so, only four students began school there this year, and the entire student body numbers only 60. This elementary school has a large, luxurious sports field covered with artificial turf from edge to edge. The sports fields at the other elementary schools are where each school's decontamination waste has been landfilled.

Monitoring Post Surveys in Iitate

Air dose rates have been similarly checked once a year at monitoring posts in Iitate Village. These have been conducted by the Iitate Village Photograph Exhibition Organizing Committee at the suggestion of a former CNIC director, Noboru Kobayashi. This committee was launched in an effort to promote the nationwide exhibition of panels made from a series of photographs taken by Kenichi Hasegawa, an Iitate resident, to keep the memory of the Fukushima nuclear accident from slipping away with time. There are two different sets of panels, Part 1 and Part 2, and the committee places requests with various localities to have them exhibited.

The surveys they are conducting were originally undertaken because some thought the readings at the monitoring posts established by the government did not reflect actual levels and they wanted to see what the reality was. Despite being busy, Mr. Kobayashi has been helping with these measurements. People have participated from as far away as Aomori. We visited Iitate this year on June 21 to 22. Below is a summary of the results and impressions at the time of the survey.

Measurements were made using five devices: two Aloka γ-ray measuring devices with a pocket survey meter, a Taugiken Tanpopo radiation counter, and two HORIBA Radi-3000 radiation monitors (in the table below, the average values of the five measurements have been converted to μSv/h). The figures derived from the measurements taken at the monitoring posts up to that time were about 20% lower than what the committee obtained with the measuring devices they brought in (even greater disparities were found in some places). Moreover, measurements taken short distances away showed much higher readings. These differences have decreased as decontamination proceeds.

Summary of the results of Iitate survey

	2016						2017					
Location of monitoring post (unit: μSv/hr)	Monitoring post	Tanpopo	Rady 1 (CNIC)	Rady 2 (Aomori)	ALOKA TCS171 (CNIC)	ALOKA pocket survey meter	Monitoring post	Tanpopo	Rady 1 (CNIC)	Rady 2 (Aomori)	ALOKA TCS171 (CNIC)	ALOKA pocket survey meter
Nimaibashi MP	0.197	0.342	0.353	-	0.24	-	0.25	0.387	0.416	0.32	0.24	0.38
Usuishi Elementary School MP	0.31	0.37	0.425	0.378	0.33	-	0.29	0.395	0.387	0.29	0.25	0.34
Hiso Community Center MP	0.438	0.62	0.59	0.569	0.46	-	0.322	0.373	0.404	0.28	0.23	0.36
Akaishizawa historical site MP	0.482	0.615	0.678	0.574	0.52	0.61	0.434	0.557	0.559	0.6	0.42	0.48
Iitoii Elementary School MP	0.454	0.62	0.563	0.655	0.42	0.46	0.391	0.461	0.544	0.54	0.34	0.47
Iitate Village Office MP	0.393	0.398	0.456	0.499	0.34	0.41	0.36	0.29	0.328	0.26	0.25	0.3
Warabidaira Community Center MP	0.56	0.835	0.762	0.66	0.55	0.69	0.464	0.646	0.677	0.46	0.39	0.66
Komiya Community Center MP	0.415	0.816	0.769	0.729	0.51	0.68	0.328	0.426	0.476	0.38	0.28	0.39
Soma Agriculture High School MP	0.568	0.743	0.759	0.673	0.6	0.65	0.503	0.6	0.614	0.47	0.43	0.53

They put us up for the night at a farm in Iitate where we talked with farmer Nobuyoshi Ito.We learned that newly built houses stood out in the village when the evacuation orders were lifted on March 31 this year. Mayor Norio Sugano is said to have held a "Welcome Home" ceremony that day, with the roadways bristling with banners saying "Welcome home!" The villagers' civic center "Fureaikan" (same name as before, but one ideogram added meaning "love") had been rebuilt a short distance from its original location and was preparing to open (it opened on August 13). Along Prefectural Route 12, which goes from Kawamata to Hara, passing through Iitate, construction of Iitate's roadside rest area "Madei-kan" was proceeding at a feverish pitch in its final stages towards its opening date of the 12th of that month. It was clear that the mayor's reconstruction policies, with support from the national and prefectural governments, were making steady progress. Previously, one could see flexible container bags stacked up all along Route 12, but now they are being taken to a separate place where they are gathered and disposed of, so hardly any can be seen from the road anymore. The village's elementary and junior high schools are concentrated near the village offices, so construction of those is also proceeding. Disagreement among the villagers has delayed their opening for a year, which is now slated for April 1 of next year.

The rate of returnees to Iitate is also about 10 percent, with extremely few of the younger generation returning. For a future imaginable to anyone, Mayor Sugano feels no need to limit the citizenry to its former residents and is soliciting people willing to settle there from across the nation. But will any new settlers show up? The biggest source of concern to the younger generation - radioactivity - is a problem for any young person and the mayor understands that well, so he seems to be grasping at straws. Beyond that, there are several unresolved issues such as ensuring employment, so it is difficult to imagine many people taking him up on his offer. For people to spend their youth in a high-radiation environment the likes of which we have never experienced before is, after all, not advisable. In view of our measurements, most people would agree wholeheartedly with that.

There are said to be plans to dismantle as many as 3,000 houses and buildings in Iitate in the future. This is because the government is providing the money to dismantle them. The dismantled houses and buildings will be reduced to ashes at incineration facilities being newly built in Warabidaira, south of Iwaki. Several repositories are being built to hold the incinerator ash and waste materials being brought to the incinerator from current temporary storage locations. The plan is to build more repositories as the amount of incinerator ash increases.

<Hideyuki Ban, CNIC Co-Director>

Fukushima Now Part 2

Current State of Post-Accident Operations at Fukushima Daiichi Nuclear Power Station

(January to June 2017)

State of the Plant

From the water temperature in the containment vessels and the spent fuel pools (SFPs), and from the state of releases of Xenon-135, released when uranium fuel undergoes fission, and other measurements, it can be estimated that the state of the reactors is stable. Further, according to an assessment by TEPCO, around 50,000 bequerels per hour (Bq/h) of radioactive materials were being released from the buildings in June (Fig.1).

The situation regarding the removal of spent fuel from the SFPs is summarized in Table 1. With the exception of Unit 4, from which spent fuel removal has been completed, all SFPs are currently undergoing pre-removal preparation work.

Surveys for molten debris were carried out for the interior of the reactor containment vessel between January 26 and February 16 for Unit 2 and between March 18 and April 6 for Unit 1. The muon tomography measurements already performed for Units 1 and 2 are being implemented for Unit 3 since May. Thus far the existence of a large amount of fuel debris has not been confirmed in the pressure vessel.

Table 1 State of Spent Fuel Pool Cleanup

Unit	Overview
Unit 1	Removal of building cover pillars and beams completed on May 11. Gathering of data, etc. for removal of debris ongoing.
Unit 2	Installation of gantry for access to operating floor on west side of reactor building completed on March 11. Preparations for installation of exterior wall aperture ongoing.
Unit 3	Installation work for cover, etc. for removal of nuclear fuel began in January. As of June, work to install rail for movement of nuclear fuel handling machinery ongoing. When that is completed, it is planned to install a dome roof and the fuel handling equipment.
Unit 4	Completed (December 22, 2014)

State of contaminated water

The government and TEPCO have formulated a mid- to long-term roadmap as a decommissioning plan for Fukushima Daiichi Nuclear Power Station (FDNPS). As contaminated water countermeasures, the current 2015 revision of the roadmap shows four areas requiring attention: removal, isolation, leakage prevention and completion of treatment of retained water.

While the changeover from flange-type tanks to welded tanks, which has been a problem for quite some time, is underway, of the current total capacity of the Unit 1-4 tanks, roughly 1.03 million m^3, about 140,000 m^3 is flange-type tanks.

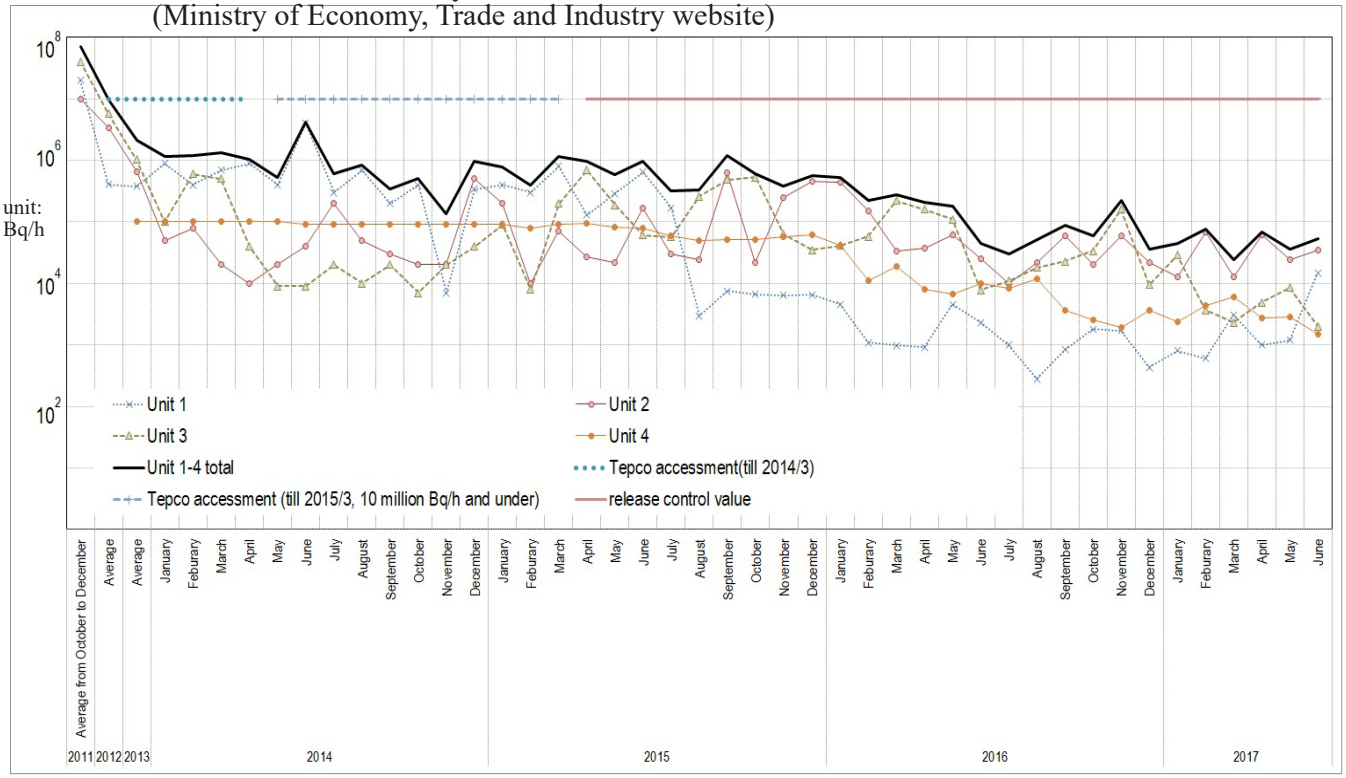
As of June 2014, the assessed value of the dose at the site boundary had risen to 10.06 mSv/y due to radioactivity being released from the tanks and other sources, but this value had fallen to 0.93 mSv/y as of March 2017 due to countermeasures such as water treatment by ALPS and other methods, and by removing highly-radioactive contaminated materials from locations close to the site border.

An important factor in the increase in contaminated water was the influx (around 400m^3/day) of groundwater into the buildings. To reduce this influx, waterproofing of the buildings, the use of a groundwater bypass to pump up upstream groundwater (currently around 200m^3/day) and release it into the sea, the use of subdrains to pump up groundwater from locations close to the buildings (currently around 500m3/day), paving of the site with asphalt (93% of planned area of 1.45 million m^2 completed), and the installation of a frozen earth barrier encircling Units 1-4 (on-land water barrier, total length roughly 1,500m) have been carried out. As a result, the influx of groundwater into the buildings was estimated at around 120-130 m^3/day as of June. Since the release of contaminated groundwater to the sea has fallen, groundwater is being pumped up (around 140-150 m^3/day) from groundwater drains and well points on the sea side. Previously, increases in the volumes of pumped up water were conspicuous after rainfall, but the fluctuations in pumped volumes has largely disappeared as a result of the countermeasures mentioned above. Pumped water volumes, however, have not fallen far enough to meet TEPCO's original target of 70 m^3/day.

The freezing of the frozen earth barrier is being implemented in three stages. Stage 1: Freezing of the entire length of the sea-side frozen earth barrier and the entire length of the mountain-side barrier with the exception of seven sections totaling 45m (sea-side barrier 690m, mountain-side barrier 860m), Stage 2: Freezing of the yet-unfrozen mountain-side barrier sections with the exception of one section, and Stage 3: Freezing of the entire length of the mountain-side barrier. 99% or more of the barrier has now reached a temperature of or lower than 0ºC, and permission to implement Stage 3 has been applied for. (Update: this was completed on August 22) However, according to assessments by TEPCO, while groundwater influx volumes on the mountain side in May were 580 m^3/day, influxes into the buildings were 130 m^3/day, volumes pumped up from the subdrains were 480 m^3/day, and the volume released to the sea side was 110 m^3/day. These volumes show that, despite being 99% frozen, the frozen earth barrier is having almost no effect at all.

(Hajime Matsukubo, CNIC)

Releases of radioactivity from Units 1 to 4 of Fukushima Daiichi Nuclear Power Station
(Ministry of Economy, Trade and Industry website)



List of Accidents at Fukushima Daiichi Nuclear Power Station

(January to June 2017)

(Excerpts from "NUCIA" Nuclear Facility Information Disclosure Library and TEPCO Website)

Date (2017)	Location	Summary of accident (Bq: bequerels, L: liters
9-Jan	Unit 4 turbine building	Water was confirmed to be dripping from the gland packing (shaft sealant) on the inlet valve of the filtered water receiving tank of the seawater desalinization device in Unit 4 turbine building (reverse osmosis equipment in building) (A). The dripping was stopped by increasing the tightening of the gland packing. No external leakage.
11-Jan	Existing ALPS equipment	Water was confirmed to be dripping from the gland packing on the outlet valve of the system An absorption tower of the ALPS (Advanced Liquid Processing System), and increased tightening was implemented. No external leakage.
11-Jan	J1 tank eastern area	Leakage was confirmed from the vicinity of the shutoff cap of the sampling valve of the rainwater desalinization treatment receiving tank on the north side of the J1 tank eastern area. No external leakage.
12-Jan	Unit 4 spent fuel pool	In the large service hatch entrance in the Unit 4 waste treatment building, leakage was confirmed from the vicinity of the drain valve on the hose connected to the spent fuel pool alternative cooling system. No external leakage.
26-Jan	Unit 2	Insulation oil was confirmed leaking from the Unit 2 main transformer. Around 10 liters is said to have leaked. No leakage outside the oil retention wall.
16-Feb	Mega-float	Of the 9 mega-float zones moored in the harbor, it was confirmed that the level of ballast water in the north side mega-float zone 1 was at the same level as the sea surface. Distortion of a reinforcement panel and possible fissures were confirmed in the lower part of the northwest side of the mega-float.
17-Feb	Additional ALPS equipment	Leakage was confirmed from the vicinity of the booster pump on the system A of the additional ALPS equipment. The leaked water remained inside the retention wall.
2-Mar	Intensive waste treatment facility high-temperature incinerator	A water puddle was confirmed in the vicinity of the filter of the second cesium adsorption equipment (SARRY) in the intensive waste treatment facility high-temperature incinerator building. No external leakage.
5-Apr	Unit 6 turbine building	Smoke was confirmed coming from a cable drum on the north side of the basement first floor of the Unit 6 turbine building. The smoke emission was confirmed to cease when the drum was disconnected from the electric mains socket.
10-Apr	Subdrain purification equipment adsorption tower	Water was confirmed to be dripping from the vicinity of the inlet valve of the subdrain purification equipment adsorption tower (B). No external leakage.
19-Apr	NPS premises	A cooperating company (subcontracted) male worker sustained an injury to the upper thigh while unloading steel stock from the top of a large truck in the vicinity of H1 east area.
25-Apr	Unit 2 reactor building	An “operating equipment abnormality” alarm sounded on the building retained water transfer terminal unit, and the Unit 2 reactor building retained water transfer pump ceased to operate.
27-Apr	NPS premises	Water was confirmed dripping from the joint on the drain valve on the upstream side filter of the existing desalinization equipment (RO-3). No external leakage.
12-May	Additional ALPS equipment	Water was confirmed dripping from the underside of the booster pump of the additional ALPS equipment (B). No external leakage.
15-May	Unit 1	A “nuclide analysis equipment panel (B) equipment abnormality” alarm sounded on the Unit 1 pressure containment vessel gas management equipment (PCV gas management equipment) system B. This was judged to be an abnormality of the nuclide analysis equipment system B detector and the detector was replaced on May 16.
1-Jun	Subdrain purification equipment	The leak detector on the subdrain purification equipment was activated, and the purification device was stopped. No external leakage.
4-Jun	G6 tank area	Water was confirmed to be leaking from the side of the (flange-type) tank A9 in the G6 tank area. No external leakage. To reduce the level of water in the tank to below the location of the leak, water was transferred to tank C8.
5-Jun	Retained water treatment device for Units 5 and 6	A water puddle was confirmed in the vicinity of the intake chamber of the Unit 5 and 6 retained water treatment device (RO device). No external leakage.
12-Jun	Additional ALPS equipment	An overflow of water occurred from the sampling sink of the additional ALPS equipment system C. No external leakage.
29-Jun	H2 and H4 tank areas	Water was confirmed dripping from the high-pressure hose between H2 tank area and H4 tank area. The location of the drip was outside the retention wall, but as there is no side gutter in the surroundings of the drip location, there was no external leakage. Furthermore, it is surmised that the dripping water was rainwater from within the retention wall that had remained inside the hose.

NEWS WATCH

MOX Fuel Arrives at Takahama NPP

MOX fuel rods arrived at Kansai Electric Power Co.’s (KEPCO’s) exclusive port at the Takahama Nuclear Power Plant (NPP) on September 21, and are meant for use at that plant. The 16 MOX fuel rods shipped had been manufactured in France by Areva NC, and departed from the French port of Cherbourg on July 5. Their route took them around the Cape of Good Hope and through the southwestern Pacific.

Currently 24 MOX fuel rods have been loaded into Unit 3 and four into Unit 4 (both units PWR, 870 MW) at the Takahama NPP. It is thought that KEPCO will load the newly arrived MOX fuel rods into Unit 4 in 2018.

Furthermore, KEPCO placed an order for additional MOX fuel on July 31. It has concluded a contract with Nuclear Fuel Industries (NFI) for the manufacture of 32 fuel rods for Units 3 and 4, and it is reported that Areva NC will be manufacturing these fuel rods under the consignment contract.

Delay Confirmed in Completion of Rokkasho Reprocessing Plant

It was confirmed on August 13 that water had accumulated to a depth of about 1.8 meters in a building housing emergency diesel generators at the uncompleted Rokkasho Reprocessing Plant owned by Japan Nuclear Fuel Limited (JNFL) in Rokkasho

Village, Aomori Prefecture. The sealant used to fill in the gaps where a pipe runs through a wall into the building from an underground pit outside had deteriorated, allowing rainwater accumulating in the pit to leak into the building. This is an important pipe, carrying in fuel oil, but had not been inspected even once in the 14 years since the building was constructed. During those 14 years, inspections of these pipes were reported as "checked," when it was another pipe carrying in cooling water that had been mistakenly inspected instead.

At a meeting of examiners held on September 13 at Japan's Nuclear Regulation Authority (NRA), which was investigating the plant's compliance with the new standards, one examiner after another made incisive remarks, such as "At this stage, the facility is not in a condition that would allow approval. The problem is whether it is okay to allow JNFL to carry out reprocessing." Completion of the facilities, which had been slated for early fiscal 2018, was confirmed delayed for the 23rd time.

[Update] Rain water once again poured into the problematic underground pit at the Rokkasho Reprocessing Plant on September 18. Moreover, it was confirmed to have flowed into another plumbing pit nearby as well. Rainwater flowed into these pits on the 21st again. The rain appears to have been the result of a typhoon's influence, but these recurring inundations despite attention being called for each time a typhoon approaches are bringing ever stronger censure from the NRA toward JNFL.

Debris to be Recovered by Aerial Method

The Nuclear Damage Compensation and Decommissioning Facilitation Corporation proposed a method to Tokyo Electric Power Co. (TEPCO) and the Japanese government for removal of fuel debris that was generated during the meltdowns of Units 1 to 3 at the Fukushima Daiichi NPP. Retrieval of debris inside the pressure vessels is to be conducted from the upper part of the buildings, but since structural elements will need to be removed first, that will be done later, and priority will be given to recovering debris that fell to the bottom of the containment vessels. For that, from the standpoint of controlling the dispersal of radioactivity and reducing exposures, it would be desirable to fill the containement vessels with water before removing the debris, but this was deemed difficult because holes in the vessels would need to be repaired, and the "aerial method"—leaving the water level low and taking the debris out through the air—was considered pragmatic.

This approach was incorporated in revisions to the Fukushima Daiichi NPP decommissioning roadmap presented by TEPCO and the Japanese government on September 1, but at this point, there is still no information on the precise position, shape, etc. of the debris. This will be continuously reviewed in light of new information as it becomes available in the future.

Approval of Changes in Nuclear Reactor Installment Proposed for Kashiwazaki-Kariwa Units 6 and 7

A proposal for approval of nuclear reactor installment changes to Units 6 and 7 of TEPCO's Kashiwazaki-Kariwa NPP (both ABWR, 1356 MW) was put forth by the NRA on October 4, upon which a comment solicitation period of 30 days began. The team of examiners compiled a report on the compliance of the facilities and equipment with the new standards, but as TEPCO's competence as a nuclear plant operator has been questioned and a cautious approach is being urged, the conclusion was put off on September 13 and again on September 20. Appealing to its competence as a nuclear plant operator, TEPCO put forth its "Basic Approach" to ensuring nuclear plant safety on August 25. The NRA held a discussion with TEPCO's chairman and president at a special session on August 30, where they confirmed that this "Basic Approach" would be considered on par with the application for approval of changes to nuclear reactor installment as evidence on which to base a decision. On September 20, the NRA agreed that the "Basic Approach" would be written into the safety regulations, thus recognizing TEPCO's competence as plant operator.

Even if approval is granted for the changes to nuclear reactor installment after solicitation of public comments and subsequent procedures go forward, no estimate has been set for restarting the reactors. In Niigata Prefecture, the first meeting of the "Committee to Consider the Effects from Nuclear Accidents on Health and Livelihood," composed of experts commissioned by the prefecture, was held on September 11. On the 19th, the first meeting of the "Committee to Consider Evacuation Methods in Nuclear Disasters" was held, and they are including the previously established "Technical Committee on Safety Management of Nuclear Power Plants" in their discussions. A "Verification Supervisory Committee" is scheduled to be formed from the chairmen and vice-chairmen of the three committees and other members yet to be appointed, which will summarize their findings. This verification is expected to take about three to four years. Governor Ryuichi Yoneyama of Niigata Prefecture says discussions on reactor restarts can begin after that.

Group Introduction:

A SEED JAPAN

By Kaori Nishijima*

A SEED JAPAN (Action for Solidarity, Equality, and Environment and Development) was established in 1991 as the Japanese section of the international campaign to deliver the voices of youth to the Earth Summit (United Nations Conference on Environment and Development). It lived through the summit and has been active for 26 years since as a youth NGO committed to environmental and human rights issues caused by economic development.

In 2017, we started a new project entitled: "Make the Process of Nuclear Waste Disposal Fair!" Why have we launched this project?

In the 1980s, nuclear power plant operators were already conducting secret drilling investigations, with a view to building final disposal facilities. But the anti-nuke citizens' movement has been fighting against these moves. So far high-level waste disposal operations lack not only fairness; they lack even proper procedure. The government says that it has adopted a fair, open process, but the reality is that decisions are made by political communications behind the scenes. As a result, the operation of nuclear power plants is taken for granted, and the storage of wastes derived from NPPs is being imposed on citizens without their consent. No fundamental solution can be obtained unless this nuclear policy is changed.

This issue is not widely known among young people. In June 2017, a national gathering was held in Okayama Prefecture to address the issues concerning radioactive wastes, but when we asked if there was any group of young people working on this issue, no hands were raised. In the following August, at a meeting with governmental agencies, a few new facts were learned: One was that the government has not studied the worst-case scenario of an accident or disaster in the course of the disposal of high-level radioactive wastes. The other was that the government has not sufficiently researched how to backfill the drilled tunnels or the possibility of waste recovery that is supposed to be guaranteed. Despite these facts, the government has said that geological disposal is safe, and that if a future generation says no to a site, the wastes can be recovered, guaranteeing them the freedom of selection. We are highly concerned about this attitude of the government. We cannot hide our anger toward the government's response that belittles the future. At the same time, we wonder how many young people are aware of these facts?

The project of "Make the Process of Nuclear Waste Disposal Fair!" has been established to further pursue this issue. The project consists of three A SEED JAPAN members, and three expert advisers. We hold open meetings to invite people who are interested in consensus-building, organizing study gatherings and holding discussions. We have also interviewed those involved in the movement against the acceptance of nuclear waste around the nation. We also invited activists from various prefectures to a nationwide opinion exchange gathering. In this first year, we intend to collect a variety of information and share it through the website and SNS.

In the future, in cooperation with those in various regions and countries, we intend to develop a youth network that METI will be unable to ignore. However, this may take some time.

People in regions hosting nuclear waste disposal sites, including as yet unborn generations, face the risk of damaged futures. This is the price they are forced to pay for 'economic development.' This is perhaps one of the most unfair issues. A SEED JAPAN is committed to continuing to help solve this issue in the future.

***Kaori Nishijima is the General Secretary of A SEED JAPAN**

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