

JAPANESE ASSISTANCE TO THE RUSSIAN NUCLEAR COMPLEX

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Introduction

Since 1991, Japan has had a troubled history in regards to its provision of assistance funds to Russia. Much has been promised, but considerably less has actually been delivered. The reasons have to do with political factors (including the Kurile Islands issue), economic problems, and technical difficulties, which have reduced Japanese incentives and made it much more complicated for Japan to follow through on its pledges than it had originally envisaged.

These same obstacles and limited fulfillment on announced donations have characterized Japanese aid in the areas of nuclear safety, environmental remediation, and nonproliferation. Beyond the well-known political disputes between the two countries and Russia's economic problems, it can be observed that Japan—compared to the United States—has faced a particular mismatch related to the nature of its technical expertise in the nuclear field and the types of problems faced by Russia, many of which are weapons related. Thus, while Japan has significant experience in civilian applications of nuclear energy (especially nuclear power), it lacks experience, for example, in the operation and dismantlement of nuclear submarines, which are responsible for many of the environmental problems facing Japan just a few hundred miles from its coastline.

My presentation will review and analyze the history and current status of Japan's assistance to Russia in the nuclear sector. First, I will provide an overview of the nature of the nuclear threats that face Japan in the Russian Far East. Second, I will provide a chronology of Japan's past assistance programs for nuclear safety and nuclear clean-up, which extend to other parts of Russia and the newly independent states (CIS) as well. Third, I will discuss the recent developments regarding Japan's nuclear assistance programs, including plans to more than double the funds provided to date with an additional pledge of some \$200 million. While this remains a relatively small amount compared to the \$3.4 billion spent by the United States and the \$4.5 billion pledged in the Extended Threat Reduction Program, it is still a significant increase, if indeed these funds are actually spent. This expansion may in part be a response to U.S. reminders to Japan that Washington alone should not have to bear the costs of improving Russian nuclear safety and assisting in military dismantlement. Nevertheless, this significant increase is a possible sign of closer Russo-Japanese cooperation in the nuclear sector, including in the civilian power sector, where Russia is one of Japan's few allies in its prolonged effort to develop fast breeder reactor technology. Finally, the presentation will conclude with a discussion of possible future trends, arguing that new Japanese aid could make a significant difference toward improving the nuclear safety and speeding weapons dismantlement, particularly in the Russian Far East.

Nuclear Threats in the Russian Far East

A short survey of Russian Far Eastern nuclear facilities shows that Japan has very good reasons to be concerned. Indeed, it may be somewhat surprising that Japan has not been *more* concerned, given the nature of the problems. It is worthwhile—in order to establish a baseline for the rest of this discussion—to undertake a brief geographical review of the nuclear facilities

in the Russian Far East, including the weapons deployed there, the kind of nuclear materials possessed outside of weapons, and the sensitive technologies located at specific sites.

Beginning in the Far North with Magadanskaya Oblast, the Bilibino nuclear power station houses four boiling water nuclear reactors with a total capacity of 48 megawatts (MW). The facility provides heat and electricity to the local region. The plant has been operating since the early 1970s and now due to be decommissioned. Plans have been made for the construction of new facilities to upgrade the power-generating capacity at the plant to 96 MW. However, there are no funds for the upgrade and, as a result, the old plant is now running beyond its scheduled service life, due to needs of the local community for its services. This situation creates serious safety hazards that concern the United States, the facility's closest foreign neighbor.

Turning to Kamchatskaya Oblast, this area is home to the Ribachiy nuclear submarine base (south of Petropavlovsk). All of the Russian Pacific Fleet's remaining active-duty ballistic missile-carrying nuclear submarines (SSBNs) operate out of this port. They include nine Delta III subs with 144 SS-N-18 missiles, which carry a total 432 nuclear weapons. The base is also the home to eleven nuclear attack submarines (SSNs), which are capable of carrying nuclear-tipped cruise missiles and torpedoes. These represent an obvious threat to Japan. Besides these vessels, the nearby ports also harbor some 23 decommissioned SSNs and one decommissioned SSBN. Many of these submarines still have operating nuclear reactors, even though they have only skeleton crews and have ceased going to sea. The reason is that there is a shortage of funds and a lack of facilities to conduct the defueling work, which only takes place on a small number of vessels each year when a special ship arrives from Chazhma Bay in Primorskiy Kray. One of the defueled submarines sank last year at its moorings and had to be refloated. A more serious incident occurred in January 2000, when two sailors bribed a guard to get on a decommissioned submarine with a still-operating reactor. They removed cables and sheets of radioactive source material related to the control system for the submarine's two reactors. Their misguided attempts to raise the control rods in the reactors themselves failed only because an engineer had welded the device down just a day before as a safety precaution. Such events highlight how close we have come to a serious nuclear accident in regards to dismantled (but not defueled) Russian nuclear submarines. Such an event could spread radiation across a large area, contaminating fishing zones used by Japan.

Farther south, in Khabarovskiy Kray, there is a large strategic air base at Ukrainka with 27 Bear-H6 bombers and 16 Bear-H16 bombers. These aircraft are capable of carrying up to 418 nuclear-tipped cruise missiles, representing a sizable nuclear arsenal that could be used against Japan and United States. Along this region's eastern seaboard at Sovetskaya Gavan is the Zavety Ilycha naval base. Although it no longer has active-duty nuclear submarines, it is still home to four decommissioned nuclear submarines, some with operating reactors. Finally, the Leninskiy Komsomol shipyard at Komsomolsk-na-Amure, which built most of the nuclear submarines serving in the Pacific Fleet during the Cold War, still has two SSNs under construction. Although work began back in the late Soviet period, these vessels are still moving slowly toward completion, even though former President Boris Yeltsin issued an order officially ending nuclear construction at the shipyard in 1992. Today, one boat is 80 percent completed and is fully loaded with nuclear fuel, awaiting completion and commissioning should the federal government ever find the funds. The other vessel is 60 percent completed and has not yet been provided with highly enriched uranium fuel. Given the long time since construction began, it is not clear if Moscow will ever be able to complete these vessels, and many of the skilled

personnel needed to do the work have already left the shipyard due to long wage arrears. At the same time, however, there is no funding for the dismantlement of these submarines either, thus posing a vexing nuclear safety and proliferation problem. Nuclear fuel could be removed with the assistance of insiders or the boats could conceivably be offered for sale to China, North Korea, or some other country with potentially hostile interests to Japan.

The highest density of nuclear materials in the Russian Far East is located in Primorskiy Krai, which is closest to the main Japanese islands. The Shkotovo Peninsula (southeast of Vladivostok) has several large naval bases, as well as facilities responsible for naval fuel cycle operations to service the broader Pacific Fleet. At the Strelok Naval Base, there are two SSBNs that are still operational (although they appear to be inactive), and at least one active SSN. In Pavlovsk Bay, over 26 decommissioned SSBNs and SSNs are moored awaiting final disposition. Well over half of these vessels have not yet been defueled, due to a lack of funds and adequate storage space for the spent fuel. Thus, they are subject to possible nuclear accidents if their control systems malfunction or are sabotaged by sailors or other infiltrators.

As for naval nuclear fuel cycle facilities, one of the most important locations is Chazhma Bay, where refueling and defueling of nuclear submarines take place. This is where a serious refueling accident took place in 1985, in which the overheating of a reactor led to the venting of a radioactive cloud that contaminated much of the peninsula. Today, fresh submarine fuel for active-duty submarines is still stored here for refueling those few nuclear submarines left in the southern Pacific Fleet and to service the larger number of vessels (in annual summer trips) located at Rybachiy (near Petropavlovsk). U.S. assistance has been provided to the Chazhma Bay facility to improve the safety of both the land-based and sea-based (on "PM" ships) storage of fresh nuclear fuel there. There has been assistance to the associated spent fuel facility at Cape Maydel (near Dunai). Fuel assemblies removed from nuclear submarines are supposed to cool here before being sent by rail to the Mayak facility in Chelyabinsk for reprocessing or long-term storage. However, existing storage sites at Mayak are full, meaning that over 5,000 spent fuel assemblies have to reside at Cape Maydel and in ship-based storage much longer than originally planned. Here again, the U.S. government has provided some upgrades to improve physical protection of this material, which could be stolen and reprocessed into weapons-grade material.

Finally, there is the nearby Zvezda Far Eastern Shipyard in Bolshoy Kamen. This facility is the only shipyard currently undertaking nuclear submarine dismantlement in the Pacific and, despite its recent history of labor unrest, it is responsible for implementation of the START I Treaty in regards to the Pacific Fleet's nuclear arsenal. The U.S. Cooperative Threat Reduction program provided \$8.4 million worth of dismantlement equipment and worker training in the mid-1990s, but problems related to unpaid wages and weaknesses in the facility's infrastructure resulted in a serious backlog in the implementation of dismantlement work. In 1998, the United States began direct contracting with the shipyard itself (instead of the Ministry of Defense in Moscow) on a "deliverables" basis to dismantle the SSBNs there. Currently, the United States plans to pay for the dismantlement of 14 such submarines at the Zvezda shipyard, which should take care of the current backlog of decommissioned SSBNs by 2003 (although additional vessels may come off-line by then). Given its role as a final dismantlement facility, the facility houses large quantities of liquid radioactive waste. Japan's major assistance program to the Russian Far East in the nuclear sector has therefore focused on this facility, but (for reasons that will be discussed below) this effort has run into considerable obstacles.

Japanese Assistance Programs

Japan has long been concerned about Russian dumping of radioactive wastes into the Sea of Japan. Russia had withdrawn from the London Dumping Convention in 1983 specifically to allow it to continue releasing low-level radioactive wastes at sea, which are created during the operation of its nuclear submarine reactors. These problems were high on the agenda in 1992 when Japan began formal discussions with Russia regarding possible assistance programs to improve nuclear safety, provide for environmental remediation, and promote nonproliferation goals. Besides posing an environmental threat, the build-up of liquid radioactive wastes also hampered the decommissioning and dismantlement of nuclear submarines because Russia lacked adequate storage and filtration facilities to deal with this backlog of material (except through its past practice of dumping it into the sea).

However, Japan was also concerned about reactor safety, due to the 1986 Chernobyl accident and the threat of similar problems elsewhere as the former Soviet economies continued to decline. As a result, in April 1993, Japan announced at the G-7 summit that it would provide \$100 million for activities related to former Soviet weapons dismantlement. But specifics remained vague. It was not clear what the funds would be spent on or how they would be divided among the four newly independent states with nuclear inheritances (Russia, Ukraine, Belarus, and Kazakhstan).

In October 1993, the Russian Pacific Fleet again dumped liquid radioactive wastes into the Sea of Japan. The story was picked up by the international news media, as planes were able to locate and track the dispersal of the wastes (due to the oil in these wastes, as radioactivity itself is not detectable from visual observation). A film of the actual dumping later made headlines and also led to the arrest of Capt. Gregory Pasko, a military journalist for the newspaper *Boevaya Vakhhta*, who provided it to foreign journalists and academics. This resumption of Russian dumping, however, led to the initiation of direct negotiations between Japan and Russia on the possible construction of a liquid waste filtration facility for the Pacific Fleet to prevent another such incident.

By April 1994, currency fluctuations had raised the dollar value of the aid package to \$114 million. The Japanese government announced that the aid package would be divided in the following manner: Russia 70 percent (about \$79 million); Ukraine 15 percent (about \$11 million); Kazakhstan 10 percent (about \$10 million); and Belarus 5 percent (about \$4 million). Most of the funds were earmarked for Japanese provision of nuclear safety equipment and waste storage containers, for Japanese hospital equipment going to Ukrainian and Kazakhstani radiation victims, and for funds to assist in the remediation of contaminated areas in Belarus affected by the Chernobyl accident. But problems ensued in the actual expenditure of the funds, as, in many cases, the recipients of the equipment wanted other things or could not guarantee receipt of equipment without government taxes and other difficulties. Many of the original pledges, therefore, were never fulfilled. One notable exception was Japan's provision of \$31.5 million (through 1999) to the International Science and Technology Center (ISTC) in Moscow. The ISTC is an international organization, formed in the mid-1990s by a consortium of Western governments, which funds civilian research projects conducted by former Soviet weapons scientists in order to prevent "brain drain" from these former Soviet facilities to the Middle East and other regions of concern. In this area, Japan has played a significant role.

As for Russia, by September 1994, the government began to complain that it still had not received anything from the promised Japanese aid package. In the Far East, the main proposed project was the development of a liquid radioactive waste filtration facility—in Russian, the so-

called *Landysh* (or lily). Given its centrality to the Japanese assistance program in the Far East, the *Landysh* project is worth covering in some detail.

Problems in the Planning, Construction, and Commissioning of the *Landysh*

As noted above, Japan had no experience in the area of liquid radioactive waste (LRW) filtration from nuclear submarines. Thus, it is not surprising that Japan's initial proposal was rejected by the Russian side on technical grounds. Recognizing this difficulty, the Japanese government issued an international tender for bids to construct an LRW filtration facility for Russia. A joint bid by the Tomen group and a U.S.-Russian technical team consisting of Babcock and Wilcox (based in Ohio, a subsidiary of McDermott International), the OKBM design bureau in Nizhniy Novgorod, and the Amurskiy Zavod (Leninsky Komsomol Shipyard) won the bid. Babcock and Wilcox had prior experience in conducting such LRW filtration work for the U.S. Navy. Work began on the project after the contract was signed in December 1995.

The main part of the filtration plant was built in the United States and shipped to Komsomolsk-na-Amure, where Russian workers constructed a barge and mounted the U.S. equipment on it. The facility was nearly finished in spring 1997, but a public protest ensued when it turned out that no one had consulted the opinion of local residents. Most were opposed to the establishment of this floating LRW filtration facility, which would make their harbor the center of all LRW work for the Pacific Fleet. A referendum held in Bolshoy Kamen in June 1997 regarding the *Landysh* resulted in 94 percent of citizens voting to reject the facility. But the referendum was not treated as legally valid because less than 50 percent of residents of voting age participated in the election. In September, however, new evidence appeared of leakage in one of the ground-based LRW storage tanks near the harbor. Public opposition to the *Landysh* began to wane. Finally, the floating facility was towed via river and sea from Komsomolsk-na-Amure and installed at the Zvezda pier in November 1997, just before the winter freeze. Although many observers expected the facility to begin work immediately, the facility's arrival was only beginning of an even longer battle over its official certification for operation by the Russian government and the Zvezda plant.

In this still on-going dispute, charges have gone back and forth about who is at fault. The Russian side says that the facility does not work and needs to be redesigned and tested, with Japan paying Russian workers for the additional refitting, recalibrating, and tests. The U.S. firm Babcock and Wilcox has ended up taking on significant costs too, due to a clause in its sub-contract with the Tomen Group that has forced it to bear a considerable portion of the cost overruns. Thus, what began as a \$24 million project has now ballooned to \$33 million, and it appears that the cost will rise even higher before it is done.

U.S. Defense Department officials interviewed by the author have indicated that the United States wants the facility completed soon, as it views the *Landysh*'s operation as crucial to speeding slowing SSBN dismantlement at the facility. But there does not seem to be much hope that the project will receive its certification soon. Besides the technical issue of whether the facility can handle all of the specific wastes contained in the LRW (which the contractor says were not all listed in the original specifications), the Russian side has complained about the eventual costs (in manpower, electricity, and other inputs) of operating the facility after the foreigners leave. Japan has offered to pay for start-up costs and the first year of operation only. In the meantime, a much smaller Russian plant has been in operation for about two years. It has reduced the LRW backlog considerably, but it does not have adequate capacity to handle the large volume of current and expected LRW at Zvezda associated with the large number of

submarines that need to be dismantled. Since over two dozen decommissioned submarines in the region have not been defueled or had their reactors shut down, this larger capacity is necessary to move the submarine dismantlement work forward. Given this long saga of problems with the *Landysh*, it is perhaps understandable why Japan has been so hesitant to move ahead more decisively into new projects to promote Russian nuclear safety and nonproliferation activities.

Recent Japanese Initiatives

In June 1999, following a U.S. announcement in early 1999 of the Expanded Threat Reduction Initiative and Washington's pledge of \$4.5 billion in additional funding, Japan announced that it would provide an additional \$200 million in aid for nuclear dismantlement and safety in Russia. It also revealed that it had spent only \$65 million of its original \$100 million pledge to the newly independent states, due to a failure to come to agreement on several proposed projects with both Russia and the other former Soviet republics.

The specific details of the new package are still vague. However, to date, there are three projects being studied. These initial efforts will reportedly be funded out of the approximately \$35 million of unspent funds in the original package. First, plans are underway to rebuild the railway connecting the Zvezda shipyard at Bolshoy Kamen to the trans-Siberian railroad, in order to speed the flow of radioactive materials and spent fuel to storage areas outside of Primorskiy Kray. Second, a pilot program is being studied to fund the dismantlement of a *Victor*-class nuclear submarine at the Zvezda facility, the first time Japan will have paid directly for submarine dismantlement work. The third project will involve the conversion of the *Pinega* liquid waste tanker into a vessel fit to carry spent nuclear fuel containers, particularly to assist in the defueling of submarines at Chazhma and at Vilyuchinsk.

Outside of the Far East, another initiative that has been announced as part of the new package is the funding of a study on the creation of mixed oxide (MOX) fuel for civilian reactors using Russian weapons plutonium. This work will be done at Russia's BN-600 fast breeder reactor at Beloyarsk. Other discussions have focused on the possible provision of Japanese funds to military enterprises to assist in their conversion to civilian production. Japan has also pledged an additional \$20 million in funding for the ISTC in Moscow.

Reportedly, a few additional items under consideration include broader funding for dismantlement of SSNs in the Pacific Fleet. Some press reports have noted figures of up to \$120 million possibly being devoted to this work. To date, the United States has funded SSBN dismantlement, but has refrained from providing support for SSN elimination, citing these vessels as mainly an environmental rather than a security threat (due to the fact that they do not carry strategic ballistic missiles). For Japan, however, the submarine issue has always been primarily an environmental one, which adds additional logic to the possibility that Japan might take on at least some portion of this work. It is worth noting that all of these SSNs can carry nuclear-tipped torpedoes or cruise missiles. Thus, they remain a potential threat to Japanese interests until they are dismantled. However, this would be a major undertaking of the sort that Tokyo has been reluctant to become involved with up until this point. If Japan were to move in this direction, it would mark a significant increase in actual aid expended in Russia.

Conclusion

Should Japan decide to increase its aid and fulfill its new pledge, even this relatively modest amount of funding (in comparison to the U.S. effort) could have a significant impact in

improving conditions at nuclear facilities in the Far East. It could also greatly reduce the nuclear threat facing Japan not far from its coastline.

As noted above, two of the biggest problems facing the Russian Pacific Fleet today are providing for spent fuel storage and conducting dismantlement of SSNs. Japan could play a major role by offering to supplement the work already being funded by the United States in SSBN dismantlement area. For Japan, this effort would help ensure that none of these nuclear attack submarines are brought back into service, that none are sold to any of its neighbors (rather than scrapped), and that there are no nuclear accidents while these vessels continue to wait for funding to allow them to be defueled and dismantled.

Several specific areas of activity would be desirable. The most sensible option would be for Japan to conduct SSN dismantlement work according to the model already established by the United States: direct contracting with the Zvezda shipyard. This facility already has the capability of conducting nuclear submarine dismantlement and could use any open slots in its schedule not currently filled by U.S. contracts on SSBNs to fit in SSNs under Japanese contracts. Moreover, since the United States plans to have completed its work by 2003, Japan could then use the shipyard's full capacity to finish off the SSN work. Another option would be to provide some modest funding to refit another facility in the Far East (such as the Chazhma shipyard, the Vostok shipyard in Bolshoy Kamen, or the Gornyak shipyard in Vilyuchinsk) to conduct dismantlement work there. Either option would be better than the current situation, with dozens of SSNs with operating nuclear reactors sitting idly and poorly protected at a number of Russian naval facilities.

Another area where Japanese aid could make a difference is in assisting Russia in working out a solution to its spent fuel storage problem, as all indications are that new work will be needed to build regional storage facilities for at least the next 10-20 years, until a broader plan is approved at Mayak. A Japanese initiative in this area could meaningfully supplement the existing U.S. program for construction of concrete casks for interim dry storage of spent fuel at regional shipyards. Japan could either provide additional funding for such casks or help pay for construction of a secure building to house the casks at particular sites. This kind of funding could go a long way toward alleviating the current backlog in dismantling nuclear submarines.

Another area relates to the possible Japanese provision of housing to retired soldiers and sailors. Unfortunately, the U.S. Congress has prevented the U.S. Department of Defense from providing such assistance to Russia, citing the existence of considerable problems related to the homeless in a number of major U.S. cities. However, if Russia is going to be able to continue downsizing its military without dangerous social repercussions, it will need to provide civilian housing to accommodate these former military men. Japanese aid for construction of apartments at a few sites in the Far East could help ease these problems and also build considerable goodwill for the Japanese government in various communities. A related effort is needed in the area of retraining, so that former military personnel can find meaningful employment in the civilian sector. Again, a modest amount of Japanese assistance could go a long way. This is also an area where Japan has considerable experience.

Finally, the conversion of nuclear-related enterprises is another high priority, especially in the Far East. But, to date, Japan has played only a very limited role in supporting this process. One facility with particular needs is the Leninskiy Komsomol Shipyard in Komsomolsk-na-Amure, the only location in the Far East capable of building nuclear submarines. Certainly, Japan has an interest in seeing that Boris Yeltsin's 1992 edict on closing this production line is fulfilled. This will ensure that no more such vessels are constructed either for the Russian Navy

or, in the future, for China, North Korea, or other countries sharing waters with Japan. The Leninskiy Komsomol shipyard is currently at a dangerous half-way point. It has no money to continue nuclear submarine construction, nor funds to dismantle the two vessels it currently has in dry dock. Japan could offer to pay for the dismantlement of these two nuclear submarines (at a cost of about \$5 million). It could also provide tax incentives to the Japanese commercial fishing fleet and to oil companies to purchase civilian ships, barges, or other vessels from the Leninskiy Komsomol shipyard in order to help speed its move into non-military production. Again, the funds required are small compared to the nature of the potential threat posed by the continued failure of the Russian government to close this nuclear production line.

Overall, Japan's new pledge of \$200 million puts it in a position to play a much larger role than it has in the past in helping to improve nuclear safety in Russia, reduce nuclear threats facing Japan, and clean up the environment in seas shared by Japan. The United States, which has already spent over \$3 billion in the former Soviet Union and has plans to spend more than this amount in additional funds, is beginning to view many of its allies as having not contributed their fair share to Russian weapons dismantlement, a process which benefits their security as much as that of the United States. Given the relatively small amounts of money involved, Japan could make a big difference if it follows through with real activities to make good on its recent \$200 million pledge. There could also be positive spin-offs from such nuclear assistance programs for broader Russo-Japanese political, economic, and security relations. On the other hand, if Japan once again fails to follow through on its pledges of nuclear assistance, the impact could set back relations considerably and worsen chances for an improvement in overall ties.

The choice is Japan's to make: either to step forward and take the risks required to initiate effective programs, or to play a waiting game and see its hopes of contributing to changes in Russia come to naught. Hopefully, the new Japanese government will have the foresight to recognize the threats, needs, and opportunities that exist in Russia's troubled nuclear sector and to engage in the necessary negotiations and technical discussions to devise new programs and to make them work.